

Translational Architecture

Kevin Matthew Hanlon

Thesis submitted to the faculty of the Virginia Polytechnic Institute
and State University in partial fulfillment of the requirements for the
degree of **Master of Architecture**

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Kevin Matthew Hanlon

(abstract)

My thesis project explores the ability of architecture to represent a culture in a meaningful way. The embassy is technically in Brazil but surrounded by the District of Columbia, USA. This poses questions about culture, ecology, and geography. The challenge is how to design a cultural-specific building without it becoming a World's Fair pavilion or a cultural cliché. World's Fair pavilions often represent just a moment within a nation's ongoing architectural discourse, as is fitting for their temporary status. Some embassies are cultural clichés, which look like how uneducated residents of the host country perceive a foreign land and are invitations to form cultural stereotypes.

My approach to answering this thesis question is in the process of translating Brazilian culture through the lens of my own culture using the medium of design and construction. This process can be described as translational architecture. The act of translation does not consist merely of mimicry but a transformation into something similar yet substantively different. This act of translation disrupts the implicit superiority of the original because the translation can have its own life, character, and depth.

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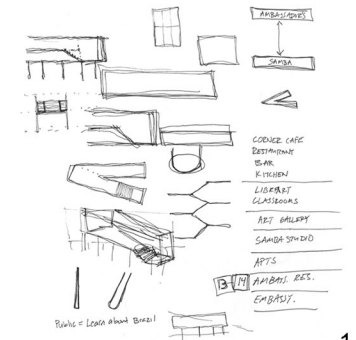
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Figure 1: (Left) Brazilian Embassy, Consular Affairs Office, and Ambassador's Residence, Washington, DC.

Figure 2: (Above) O Horizonte (The Horizon) Ubatuba, Brazil

Figure 3: (Below) Sketch of progression through programmatic pieces.



Introduction

This book is the product of my design and research conducted during the 2008-2009 school year at Virginia Tech's Washington-Alexandria Architecture Center. The decision to design a foreign embassy building and its subsequent architectural program, building site, and thesis question are products of my individual thesis process and illustrate my particular interests and architectural intentions.

Site and Program Selection

The District of Columbia is an extraordinary site because there are building types that are unique to the nation's capital. Chief among these buildings are foreign embassies. What in common parlance is generally referred to as an Embassy is more technically called a Diplomatic Mission, and is often composed of several buildings. The chancery is where members of the diplomatic delegation work and sometimes live. In some instances, the ambassador also has a separate residence called, simply, the ambassador's residence. There can be any number of buildings that make up an "Embassy."

My choice in designing an Embassy for Brazil stems from the desire to learn more about all things Brazilian. My wife is a Brazilian citizen and I felt that I had a lot to learn about her culture. She, as a Brazilian living in Washington, DC, is analogous in many respects to the concept of the Brazilian Embassy in the District. They are both islands of Brazil in a foreign land whose Brazilianess is exposed on all sides. Both are cultural mediations and thresholds. The process of unraveling the enigma of what they are, crossing the thresholds they create, and becoming their reciprocal mediation is key to both my thesis question and its answer.

Existing Embassy

Originally I wanted a design whose program matched that of Brazil's current set of buildings on Massachusetts Ave., NW. Brazil has a "glass-box" chancery building, a converted Federal Style row house for consular services, and a John Russell Pope designed residence, all at the intersection of Massachusetts Avenue and Whitehaven Street NW¹. This program has evolved with site research and a better understanding of the goals of Brazil's cultural outreach to the United States. Prior to 2008, Brazil's government sponsored the Brazilian American Cultural Institute, which was located in the Tenleytown area of Washington, DC. The institute offered language and dance classes, had spaces

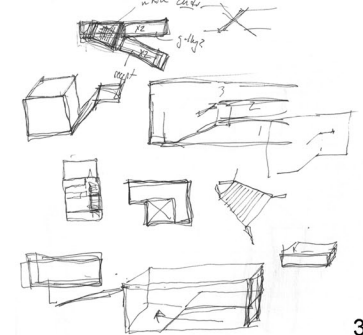
¹ See figures 1 and 4.



Figure 4: (Left) Brazilian Embassy, Consular Affairs Office, and Ambassador's Residence, Washington, DC.

Figure 5: (Above) A Serra (The Mountain Range) Campos de Jordao, Brazil.

Figure 6: (Below) Sketch of theater and intersection of building wings.



available for exhibitions, receptions and recitals and had an extensive library and reading room. Due to financial difficulties, the institute was closed. I plan that these program pieces re-emerge in my design for the Brazilian Embassy.² My proposed site is better situated to attract more members to the Cultural Institute and would also be subsidized by the ground floor restaurant. Coupled with residential and retail components, these new program pieces would create an embassy complex that really engages its community and comforts members of the diplomatic mission.

The integration of the cultural institute into the complex's program would also fulfill the desires of architecture critic Ben Forgey who wrote of the site:

Care should be taken not to line the north side with a solid phalanx of public and private office buildings, which will close down completely at night and on weekends.... Pennsylvania Avenue should be... lively, friendly, inviting, as well as dignified and impressive.³

House of Sweden Case Study

As part of my research of embassies and their programs, I performed a case study on the House of Sweden whose program and goals of cultural outreach are similar to my intentions for the Brazilian Embassy and Cultural Institute. The typical Washington, DC embassy is found on Massachusetts Avenue NW, which is known as Embassy Row. Some embassies are custom buildings, often erring on the stereotypical while others, like the Finish Embassy, are architectural jewels. While their architectural quality varies, the connection to the life of the city does not. Embassy Row does not attract large numbers of office workers, shoppers, or restaurant goers during the day and does not have nightlife aside from Embassy functions. There are few cultural or entertainment attractions outside of the embassies themselves. The Swedish cultural attaché described the social connections on Embassy Row as a series of closed-door meetings with others on Embassy Row. In building their embassy in the heart of Georgetown, the Swedish government wanted to change their level of engagement with the community and to practice cultural diplomacy with all walks of life. While it can be argued to what degree the House of Sweden was able to achieve this goal, their intentions are certainly laudable. A building as a catalyst for cultural exchange is one of my highest priorities in designing the Brazilian Embassy.

² See figure 54-58.

³ Forgey, Benjamin. "Moynihan's Legacy Is Written in Stone" Washington Post (2000) C.01

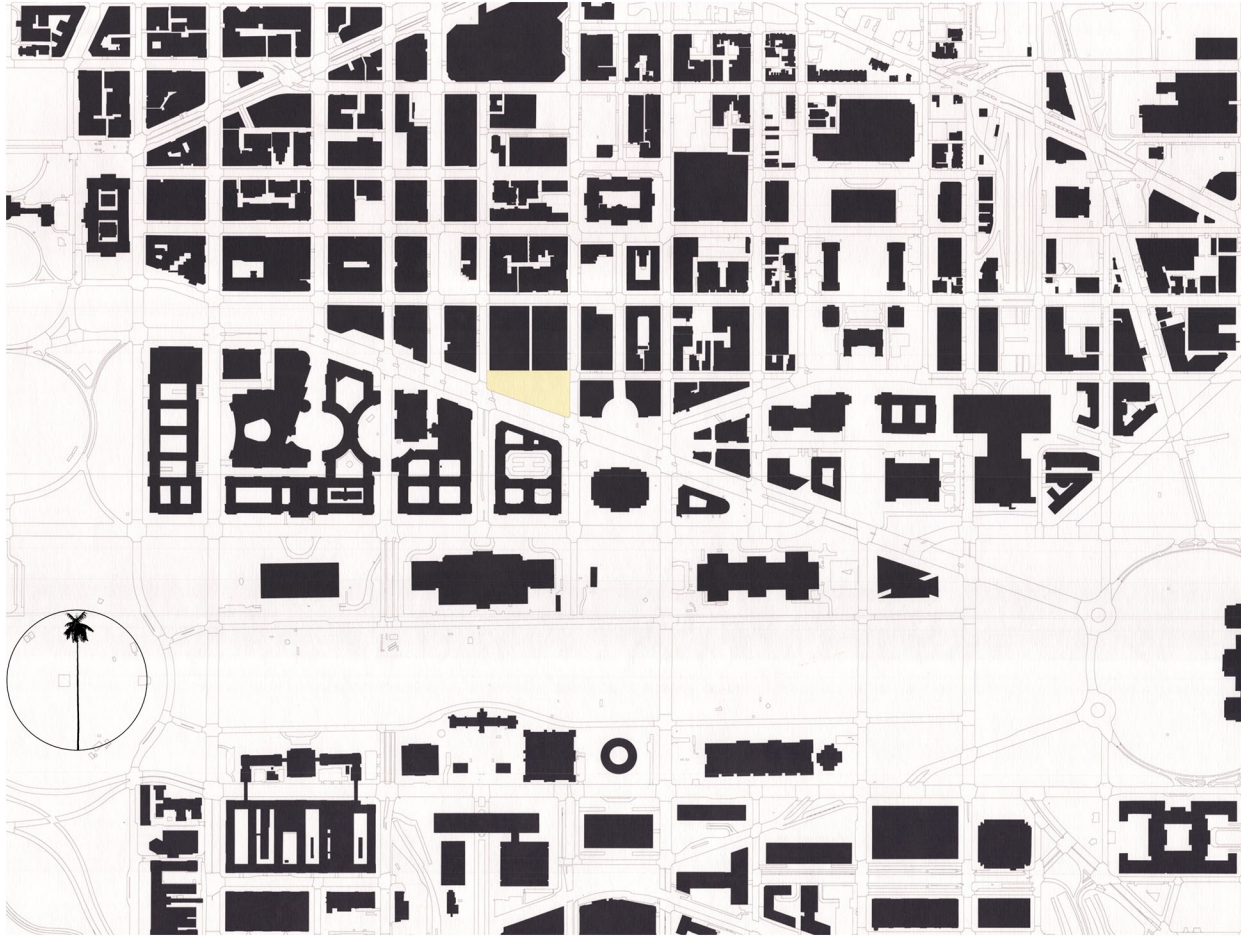
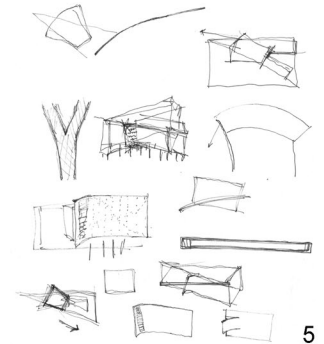


Figure 7: (Left) Figure/Field map of Washington, DC with site highlighted.

Figure 8: (Above) *A Diagonal* (The Diagonal), Parque de Cuidade, Sao Jose dos Campos, Brazil.

Figure 9: (Below) Sketch of ideas for views down Pennsylvania Avenue.



The House of Sweden is unlike the typical Washington, DC embassy not just because of its location. The House of Sweden is three distinct buildings in one: corporate apartments, an event center, and the Swedish Embassy combined into one integrated form. From a distance the House of Sweden has the mass and look of an office building. A closer inspection with an eye for detail reveals the core tenants of Swedish design: simple, modern and elegant architecture. The most successful space in the House of Sweden is the Anna Lindh Exhibit Hall on the ground level. The Hall is approx 1,837sq. ft. of open, multi-purpose space. The Hall has floor to ceiling glass window walls on three sides, offering unparalleled views of Rock Creek and the Potomac River. These windows can be opened on the southeast and southwest corners to connect the hall to the riverfront terrace. The program and architecture is a reflection of Sweden's open society and culture. The transparency of the hall is the translation of the open society into the American built environment. As there are no barriers, walls, or armed guards, the building does not give the appearance of a foreboding fortress. Anna Lindh was a Swedish public official who was murdered in a public place. Instead of being reactionary to the issue of security, the Swedish Government reaffirmed their societal commitment to openness.⁴ Anna Lindh Hall is a continuation of the Swedish people's quest for an open, free, and peaceful society translated into the American context, speaking to an American audience. The Swedish Government could have moved in the opposite direction and the world would have understood, but their decisions reflect their core tenants past, present, and future.

There are also portions of the design of the House of Sweden that are less than satisfactory. The corner of Georgetown that the House of Sweden is in does not attract large numbers of locals or tourists compared to other nearby streets. The location of the Embassy complex is accessible by public transportation but not to the subway. And it is not a location that tourists or Washingtonians will stumble upon accidentally. The exterior is also not as welcoming and open as the interior feels. One is uncertain of where the main entrance is and if they can walk right in. The end result is that visitors come to the House of Sweden only for specific events, which dilutes the point of being in a more accessible location than Embassy Row. The House of Sweden's three program pieces also lack any overlapping areas that transition from one piece to the next. Visitors to the complex are only free to roam the main level and the basement level and are thus unable to experience the sectional qualities of the design and cannot access the magnificent views above the tree line.

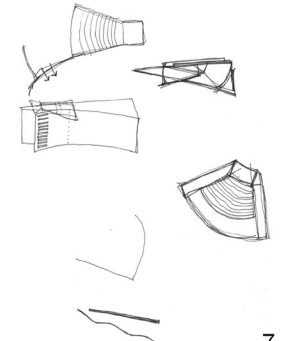
⁴ Mays, Vernon. "Swedish Lantern: A New Embassy Uses State-of-the-Art Technologies to evoke Scandinavian Simplicity" (2008)



Figure 10: (Left) The J. Edgar Hoover FBI Headquarters Building.

Figure 11: (Above) *O Modilhão* (The Cantilever), Museum of Modern Art, Sao Paulo, Brazil.

Figure 12: (Below) Sketch of theater layout and egress.



The Proposed Site

The National Capitol Planning Commission's (NCPC) draft of the National Capital Framework Plan makes specific note of a site bounded by Pennsylvania Ave NW, 10th St NW, 9th St NW, and the extension of the D St right-of-way⁵. They recommend, given the heightened security concerns and civic dead-zone that it creates, that the FBI, the current tenant of the site, find a new home. NCPC argues that, because the FBI already needs more office space, it should build a new headquarters on a larger plot of land in the suburbs or across the Anacostia River on federal land.⁶ The FBI building was designed to accommodate ground floor retail, but none was ever brought in. The façades are monotonous and unwelcoming while the large cantilever pieces along the north end are unsettling. The FBI Headquarters building does not welcome the public, and the much-acclaimed tours of the building have been discontinued for a decade now. The NCPC recommends that once the FBI leaves, D Street should re-divide the site, as it did prior to the construction of the J. Edgar Hoover Building. They suggest, and I agree that this new passage should be pedestrian only.⁷ They further recommend that the triangular site created by this division be given over to a cultural function with a monument or memorial at the intersection of 10th and Penn. This corner was the original home of the Benjamin Franklin memorial (now across the street at the Old Post Office building).

Site History and Precedents

The buildings on the FBI site were razed in 1963 just prior to phase one of the headquarter's construction. A number of very important buildings once stood where the J. Edgar Hoover building now stands⁸. French & Richardson's Bookstore was located at 909 Pennsylvania Avenue, NW and was built in 1810, twenty years after L'Enfant arrived to design the city and four years before the British burned down Washington's federal buildings⁹. The bookstore later became a pharmacy, which was razed to make room for the FBI. Metzertott Hall at 925 Pennsylvania Ave. NW was built in 1851 and is noted for having the city's first main facade made of cast-iron. Metzertott Hall sold musical equipment including Steinway Pianos. The building's second floor briefly housed the DC Legislature until Congress repealed their charter.¹⁰

⁵ See figures 7,13, 52-53.

⁶ National Capital Planning Commission and U.S. Commission of Fine Arts. The Monumental Core Framework Plan: Connecting New Destinations with the National Mall. 2009

⁷ See figure 53-54.

⁸ Figure 16.

⁹ Goode, James M. *Capital Losses: A Cultural History of Washington's Destroyed Buildings* (1979): 246

¹⁰ (253-254)



The Framework Plan proposal for Pennsylvania Avenue and the Federal Triangle.



Framework Plan proposal for a new destination on Pennsylvania Avenue.

1. Reuse the Old Post Office building, annex, and the northern wing of the IRS building for a mix of hospitality and cultural uses.
2. Redevelop or adaptively reuse the J. Edgar Hoover Building site with a mix of federal offices, street-level retail, and cultural uses.
3. Redesign the 10th Street streetscape as a beautiful and welcoming forecourt to the National Museum of Natural History and a transit commuting center.
4. Enhance Pennsylvania Avenue to improve its beauty and encourage street life, culture, and commerce.
5. Improve pedestrian comfort and visitor services at Freedom Plaza and Pershing Park, and strengthen the plaza's role as a premier civic space for the city of Washington.
6. Improve pedestrian access by adding two entrances to existing Metrolink stations.
7. Build to the highest green standards and develop a green energy cooperative to harvest renewable energy for use in historic buildings within the Federal Triangle.

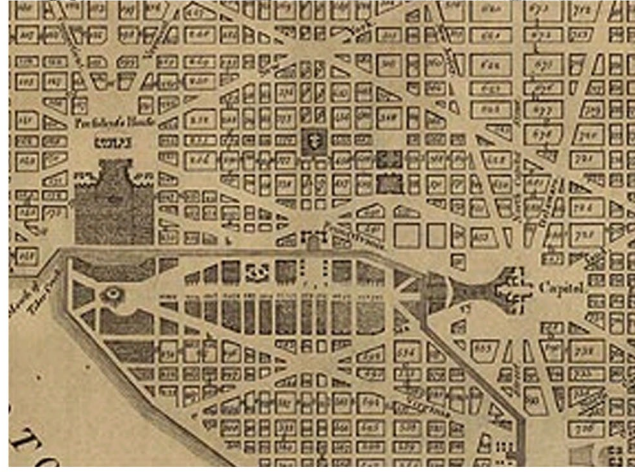
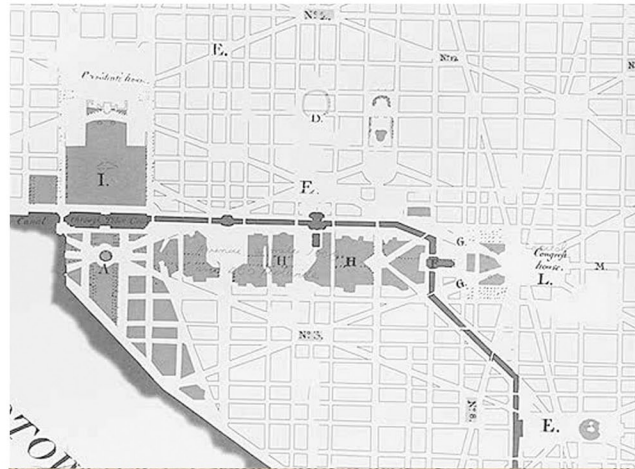
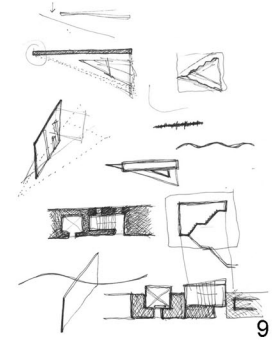


Figure 13: (Left) NCPC Framework Plan (left), L'Enfant Plan (upper right), Ellicott Plan (lower right). See Appendix A for citations.

Figure 14: (Above) *A Cidade Infinita* (The Infinite City), Sao Paulo, Brazil.

Figure 15: (Below) Sketch of vertical circulation and service bar along north edge of building.



Perhaps the most interesting building once on the site was the Alderney Dairies Plant located at 929 D. Street NW. The structure was designed by Glenn Brown and built in 1884. Frank Ward, who was Washington's biggest dairy retailer, commissioned the building. Brown designed a six story eclectic building with a very unique program. The ground floor was used for retail. DC residents could buy milk, buttermilk, cottage cheese and cream there. The ground floor also housed the nation's first dairy lunchroom and loading area for Ward's sixteen delivery wagons. The second and third floors contained cooling vats and company offices. The fourth floor was comprised of Ward's apartment and a company gymnasium. The fifth floor was reserved for sleeping quarters for all eighty employees who were required to live on site. The sixth floor was filled with dining rooms, kitchens, and pantries for Ward and his residents/employees. Brown designed a Moorish arch entrance to the building and placed a full size terra cotta cow sculpture in the pediment. The architect also designed cow's head spandrels. The building's height was increased by the placement of a windmill that pumped water from an artesian well to a storage tank on the roof.¹¹ The windmill was capped by a large decorative Greek temple that is reminiscent of, though predating, the Lincoln Memorial.

What makes this building extraordinary is that it was a true mixed-use building with ecological systems built 124 years ago. DC, like most major cities, actively encourages mixed-use buildings and the Alderney Dairy is a perfect example of how it can be done. The Alderney Dairy made me consider including residences, a gym and other collective amenities for the embassy employees, a restaurant on the ground floor, and extensive dining facilities for the employees within the building.¹²

Historic Justification

The site seems appropriate for the Brazilian Embassy and Cultural Institute because it is close to what L'Enfant had in mind for embassy buildings when he was designing the city. L'Enfant had the idea that the District Commissioners should give away parcels of land near "circles" to foreign governments to build embassies in order to spur the development around these nodes, which would be spread throughout the city.¹³ Similarly, L'Enfant wanted to give state governments additional parcels around circles in order to achieve the same goal. L'Enfant believed that these circles would showcase the goods,

¹¹ (268)

¹² See figure 54, 55, and 58.

¹³ Berg, Scott. *Grand Avenues: The Story of the French Visionary Who Designed Washington, D.C.* (2007)



Figure 16: (Left) Historic structures at thesis site including Alderney Dairy (bottom left) and French's Bookstore (upper right). See Appendix A for citations.

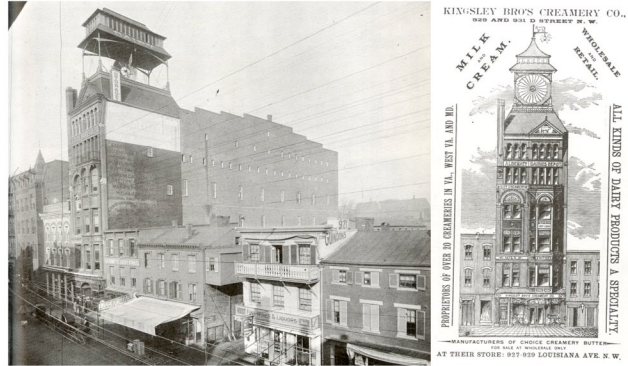
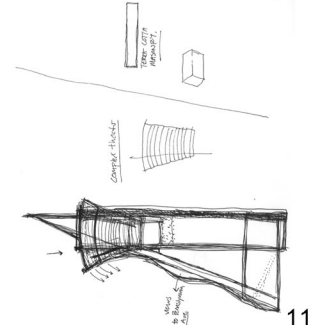


Figure 17: (Above) *O Sagrado* (The Sacred) Our Lady of Aparecida, Aparecida Basilica, Brazil.

Figure 18: (Below) Sketch of theater with views toward U.S. Capitol Building.



services, and national icons of the state or nation. L'Enfant also had the idea to line the grand avenue (national mall) with embassies.¹⁴ This would in effect create a walk of nations in a very public and accessible part of the city's core. The site I chose is very near the national mall, a block from the subway and the Navy Memorial, and across Pennsylvania Avenue from where Central Market once stood.¹⁵

Thesis Question

My thesis project explores the ability of architecture to represent a culture in a meaningful way. The embassy is technically in Brazil but surrounded by the District of Columbia, which poses questions about culture, ecology, and geography. I did not want a building that was just a World's Fair pavilion or was a cultural cliché. World's Fair pavilions often represent just a moment within a nation's ongoing architectural discourse, as is fitting for their temporary status. Some embassies are cultural clichés, which look like how uneducated residents of the host county perceive a foreign land and are invitations to form cultural stereotypes.

Translational Architecture

My approach to answering this thesis question is through the process of translating Brazilian culture through the lens of my own culture using the medium of design and construction. This process can be described as translational architecture. The act of translation does not consist merely of mimicry but a transformation into something similar yet substantively different. This act of translation disrupts the implicit superiority of the original because the translation can have more life, character, and depth than the original.¹⁶

Translational architecture was part of the *Antropofagia* (Cannibalism) Movement in Brazil, which was based on the 1928 manifesto of Oswald de Andrade in which the author argued Brazil's cultural independence through the metaphor of cannibalism.¹⁷ The manifesto is based on a historic episode in Brazil's early history. Sometime during the 16th century the indigenous Tupinamba tribe ate a Catholic priest.¹⁸ The news of this event sent shock waves through Europe. The Tupinamba's response was that eating the priest was

¹⁴ Berg, Scott. *Grand Avenues: The Story of the French Visionary Who Designed Washington, D.C.* (2007) 102, 161.

¹⁵ See figure 52-53.

¹⁶ Hernandez, Felipe., Millington, Mark., Borden, Iain., Eds. *Transculturation: Cities, Spaces and Architectures in Latin America* (2005): 136

¹⁷ 62, 135-136

¹⁸ Levine, Robert M., Crocitti, John J., Eds. *The Brazil Reader: History, Culture, Politics* (1999) 13

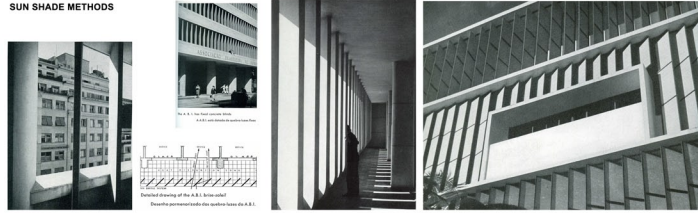
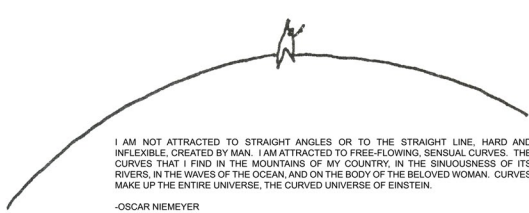
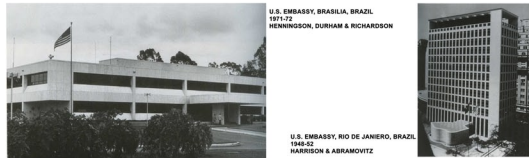
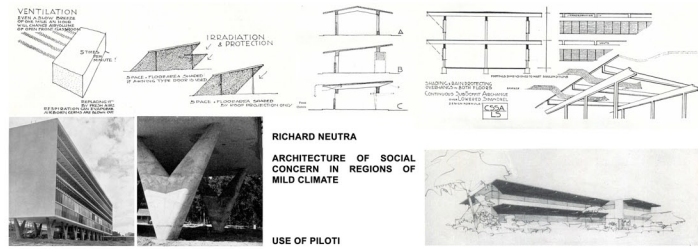
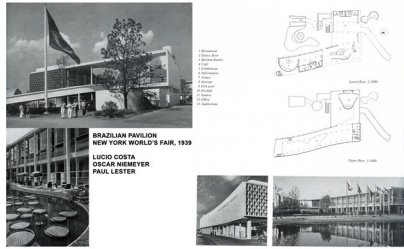
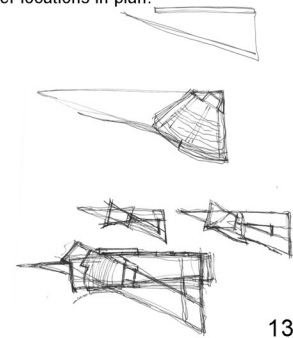


Figure 19: (Left) Collage of Brazilian design elements, modern architecture in Brazil, the US + Brazilian Embassies, and Neutra's suggestions for Brazilian architects. See Appendix A for citations.

Figure 20: (Above) *A Sombra* (The Shadow), Parque de Cuidade, Sao Jose dos Campos, Brazil. Architect: Rino Levi.

Figure 21: (Below) Sketch of theater locations in plan.



an act of homage because they chose to eat what they most admired. One might assume that this admiration might lead the Tupinamba to undergo a sudden religious conversion or begin to act like Europeans. Instead the effect of the Catholic priest on the cannibal was nourishment.¹⁹ The foreigner was ingested, digested, and eventually expelled. The Catholic priest's essence was incorporated into the cannibals' being. The term "conquer" in Middle English meant "to acquire" and stems from the Latin "*conquirere*" meaning "to search for or collect." In this circumstance it was the natives who searched for and then acquired the foreign conqueror. The reversal of roles that allowed the translation to conquer the original is the same method that led to the rise of Brazilian modernism and is therefore a case study in the process and product of translational architecture.

Translating European Modernism

Le Corbusier visited South America for the first time in 1929. While there, he lectured in Rio de Janeiro²⁰, Sao Paulo²¹, Montevideo, and Buenos Aires. At this time Brazil was thriving economically, but was just about to be hit by the Great Depression. Corbusier paid special attention to Rio, where he was enthralled with the sensuous topography and locals.²² Corbusier may also have been trying to steal the commission of the Frenchman Alfred Agache who was designing a master plan for a portion of the city. Corbusier ended up sketching proposals for his views on the development of Rio that were punctuated by highways 100 meters high meant to link the various topographies of the city. The plans for Sao Paulo and Rio de Janeiro were later published in Corbusier's *Precisions*.

In 1936, Minister of Education and Health Gustavo Capanema, brought in Corbusier to consult on the Ministry of Education and Health building in the Capital of Rio de Janeiro. The Brazilian government was not able to pay him directly for the consulting work so they paid him an exorbitant amount of money for a series of lectures.²³ Architect Lucio Costa brought Corbusier so that the internationally known architect would give his approval and win over government officials skeptical of modernism. Corbusier's response to the Costa/Niemeyer designed project was to suggest a completely new design on a very different site.²⁴ Further, Corbusier once again suggested the complete redesign of the entire city of Rio using "Y shaped Cartesian skyscrapers. Corbusier's suggestions were

¹⁹ Hernandez, Felipe., Millington, Mark., Borden, Iain., Eds. *Transculturation: Cities, Spaces and Architectures in Latin America* (2005): 194

²⁰ See figure 23.

²¹ See figure 14.

²² Deckker, Zilah. *Brazil Built* (2001) 18-19

²³ Deckker, Zilah. *Brazil Built* (2001) 181

²⁴ (35)

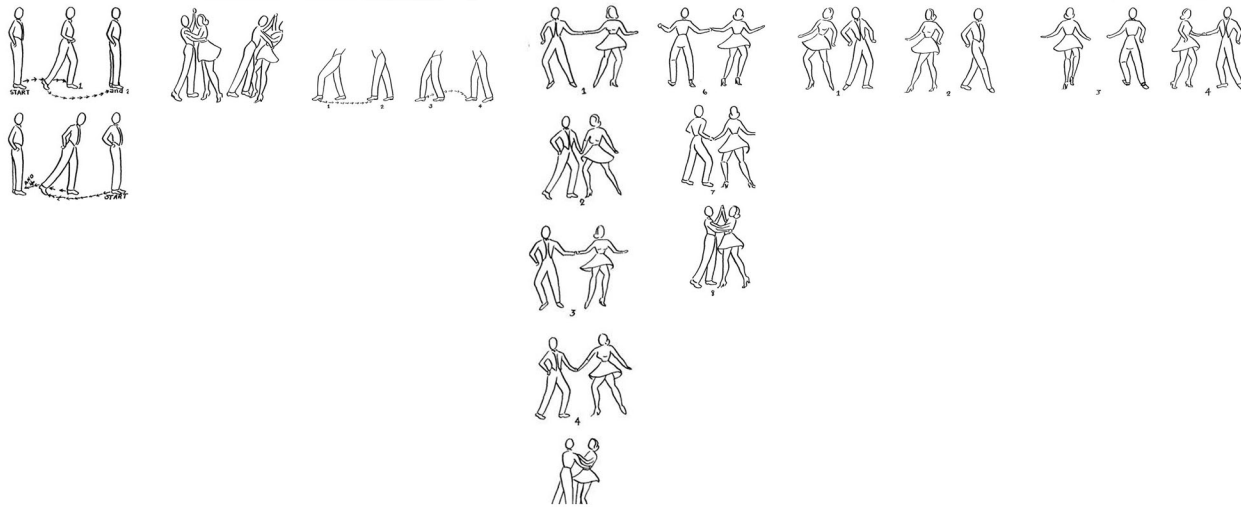
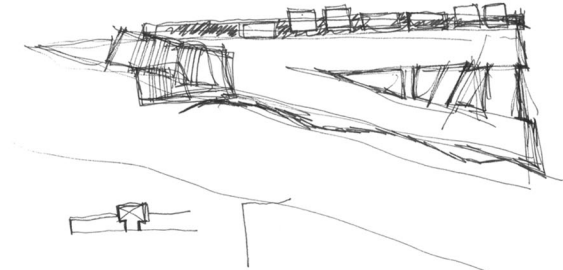


Figure 22: (Left) Ballroom Samba steps. See Appendix A for citations.

Figure 23: (Above) *O Passeio* (The Promenade), Copacabana beach, Rio de Janeiro, Brazil. Landscape Architect: Roberto Burle Marx.

Figure 24: (Below) Sketch of floor plan with bridges crossing central atrium space.



rejected outright. While Corbusier may have been disappointed that the Brazilians did not do exactly as he wished with the building commissions, it is certain that his ideas and lectures left a strong impression as evidenced through the design of the city of Brasilia, Niemeyer's South American Hospital, Ribeiro's Hotel Amazonas and Hotel da Bahia, and M.M.M. Roberto's Brazilian Reinsurance Institute. Le Corbusier came to Brazil as a missionary of modernism to colonize and proselytize, but like the missionaries who came before, he was cannibalized instead.

The highest achieving Brazilian architects of the first half of the twentieth century -- such as Costa and Niemeyer -- did not copy European ideas directly, but incorporated aspects of modernism into their context in a critical manner. These architects emerged with confidence and a clear sense of direction in what can be described as substantively second-generation modernism and at the same time, fully Brazilian. Architectural historian Kenneth Frampton described this type of modernism as "critical regionalism" where the over-arching concepts of modernism are utilized in a manner responsive to a particular local climate, context, topography and culture. The use of locally available materials is central to this concept. This independent strain of modernism was thus able to, in turn, influence both American and European architecture in the process of transculturation.

Translating Culture

The period from 1880 to the 1920's was dominated in Brazil by a ruling oligarchy. The states of Sao Paulo (coffee wealth) and Mineis Gereis (dairy wealth) alternated selecting the president, leaving the larger, though less wealthy portion of Brazil, disenfranchised. When the Great Depression caused Brazil's exports to drop dramatically, it loosened Sao Paulo and Mineis Gereis' stranglehold on the government, and allowed Getulio Vargas to seize control of the government.²⁵ Vargas' coup d'etat (Revolution of '30) heralded the triumph of industrialization over agrarian interests and led to the federal policy of modernization.²⁶

The initial years of the Vargas administration were an incredibly formative period in Brazilian cultural history because the federal government began to distance itself from Portugal and to question what was really Brazilian. The Brazilians, to varying degrees, rejected American cultural imports and European dance and music, which they considered 20th century cultural colonialism. In this manner, the *Antropofagia* movement can be seen

²⁵ Levine, Robert M., Crocitti, John J., Eds. *The Brazil Reader: History, Culture, Politics* (1999) 162-164

²⁶ Hernandez, Felipe, Millington, Mark., Borden, Iain., Eds. *Transculturation: Cities, Spaces and Architectures in Latin America* (2005): 65, 175.

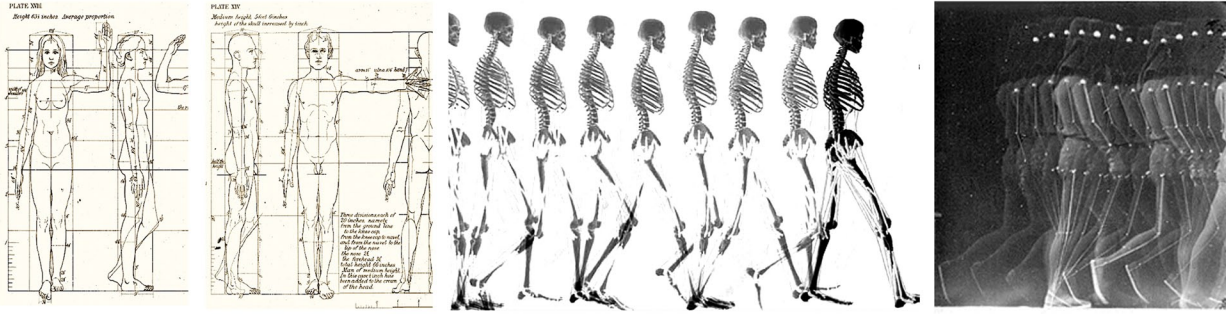


Figure 25: (Left) Collage of movement and form. See Appendix A for citations.

Figure 26: (Above) *Os Movimentos* (The Movements). Fashion Show, Sao Jose dos Campos, Brazil.



Figure 27: (Below) View of building looking down Pennsylvania Avenue.



as a necessary precursor to the "Revolution of 30" and the national policy of rejecting cultural imports. This invariably led from 1930 to 1945 to the re-inventing or creation of a new national dance/music, a new national sport, modern art, a new national dish, and even the attempt to create a distinct Brazilian ethnicity.²⁷ These cultural constructions are important to my design of the Brazilian Embassy and Cultural Institute because their development parallels the period from 1920-1950 when Brazilians used reinforced concrete to develop their distinct and modern architectural voice. My design attempts to bring these cultural elements from Brazil to Washington, DC and to translate their phenomenological experience into the atmosphere of my proposed building.

Samba and Brazil's Cultural Constructions

Samba music, which combines elements of sensuality, the lyrical style of African traditions and the syncopated rhythm of European influences, took root in Brazil beginning in the late 19th century, but languished for decades. At the time of the revolution, it survived mainly in the slums of Rio de Janeiro among Brazil's poorest and previously least influential citizens.²⁸ Samba²⁹, the underlying rhythm and dance performed during carnival, was re-appropriated as a vehicle to unify the Brazilian people during the Vargas administration. Samba Schools, at the direction of the Vargas government, composed and performed original sambas for Carnival with a nationalist theme.³⁰ Carnival also unified the Brazilian people by making the poor slum dwellers the most important people in the city for at least a few days a year, highlighting traditional Brazilian clothing, and showcasing racial equality in an era when segregation was the norm and racial/ethnic hatred fueled wars. In the same manner that Carnival was used to show Brazil what it meant to be Brazilian, samba and Carnival can be used to show America Brazil's cultural traditions and values. Samba and Carnival are particularly interesting in regard to my building site because Pennsylvania Avenue is America's premier parade route.³¹ I have also included a dance studio and performance space in my building where visitors to the Embassy will be able to take dance classes, watch Carnival preparations, and see live shows.³²

²⁷ Vianna, Hernmano., ed. Chasteen, John. *The Mystery of Samba: Popular Music and National Identity in Brazil*. (1999): 12, 70-72

²⁸ Poelzl, Volker. *Culture Shock: A Survival Guide to Customs and Etiquette* (2006) 202-204

²⁹ See figures 22, 28, and 31.

³⁰ Vianna, Hernmano., ed. Chasteen, John. *The Mystery of Samba: Popular Music and National Identity in Brazil*. (1999): 12, 90

³¹ See figures 30 and 36.

³² See figure 56 and 57



Figure 28: (Left) Capturing Samba.

Figure 29: (Above) *O Ritmo* (The Rhythm). Sao Jose dos Campos, Brazil.

Figure 30: (Below) Views down D Street and Pennsylvania Avenue from eye-level.



Soccer, volleyball, handball are all very important sports in Brazil, but capoeira is the national sport. Capoeira is a martial arts form that is combined with stylized dance moves. Its origins trace back to slaves who trained to fight under the guise of ritual dancing. The sporting event is comprised of a large group of competitors (capoeiristas) who encircle a pair of fighters in a duel. The fighting and acrobatic moves are carried out to the rhythm of percussion instruments and clapping. The fighters never touch one another, but try to best each by means of physical and acrobatic ability.³³ Capoeira's use of a samba beat and a syncopated note is sometimes used to signify a change in fighters. A space for capoeira could be made on the roof garden and capoeira performances could be given in the dance performance space.³⁴

Food in Brazil is very different than in the United States and perhaps the whole of the Americas. I thought it critical to provide the proper eating facilities with the embassy complex. Brazilians have coffee, fresh bread, and fruit for breakfast. I have included a café so that the Embassy employees and DC residents can enjoy fresh baked bread, juice, and coffee. This could also function as a lunch counter reminiscent of the Alderney Dairy building. Taking an hour for lunch is mandatory in much of Brazil. Brazilians do not have sandwiches for lunch. Instead they opt for eating a hot lunch at a restaurant or at home. Since it is impractical to send all embassy employees home for lunch, I have provided a restaurant above the café that could serve hot lunches during the workweek.³⁵ The restaurant could turn into a churrascaria for dinner. The churrascaria would serve Brazilian cuts of beef³⁶, traditional drinks, and feijoada³⁷, which is Brazil's national dish.

Translating Materials and Methods of Construction

Vargas' reaction to the Great Depression was to modernize. Prior to 1929, Brazil's economy was based on the exportation of raw materials. In Brazil modernism is linked to industrialization instead of technology because Brazil had yet to industrialize in the way Western Europe and the United States had. Mass production and speed thus had not taken hold in Brazil and were not integral to Brazil's concept of modernism.³⁸ Vargas wanted to industrialize his nation through government spending on hospitals, schools, and other government facilities. With modernism being the express goal of the 1930 Revolution

³³ Poelzl, Volker. Culture Shock: A Survival Guide to Customs and Etiquette (2006) 190

³⁴ See figures 51, 57, and 63.

³⁵ See figures 54 and 55.

³⁶ See figure 49.

³⁷ See figure 50.

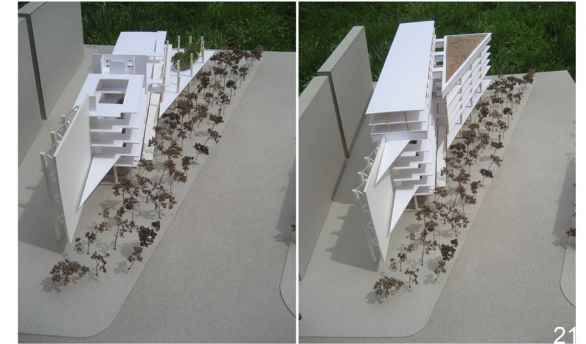
³⁸ Hernandez, Felipe., Millington, Mark., Borden, Iain., Eds. Transculturation: Cities, Spaces and Architectures in Latin America (2005): 69



Figure 31: (Left) The Fluidity of Samba.

Figure 32: (Above) *A Curvatura* (The Curvature). Sao Jose dos Campos, Brazil.

Figure 33: (Below) View of Western atrium, ramp, bridges, and roof deck.



and the Vargas government, it should not be surprising that Vargas looked to modern architecture for the design of new buildings. Gustavo Capanema, Minister of Education and Health, commissioned two major projects: Cidade Universitaria and the new Ministry of Education and Health building³⁹ in the capital of Rio de Janeiro. Capanema appointed modernist Lucio Costa as architect of both projects who asked Oscar Niemeyer to join his design team.

Costa and Niemeyer were also tasked to design the Brazilian Pavilion at the New York World's Fair of 1939⁴⁰. In the 1940's Juscelino Kubitschek, mayor of Belo Horizonte and future president, commissioned Oscar Niemeyer and Lucio Costa to design a new chapel, casino, and yacht club.⁴¹ These buildings share common elements including: a reinforced concrete structure, sun-shading devices, and glazed ceramic tiles (azulejos).⁴² Reinforced concrete was used in Brazil because they did not have the capabilities to create rolled steel members.⁴³ Additionally, labor was cheap and the raw materials needed to create concrete were abundant in Brazil.⁴⁴ For architects like Niemeyer, reinforced concrete allowed free-flowing forms made out of thin concrete shells. Other Brazilian architects in the 1920's and 1930's tried to make their buildings look like American steel skyscrapers despite being made of reinforced concrete.

The 1940's brought about major changes to the technology available to Brazilian architects and the theoretical reasoning behind their uses. The initial rejection of Portuguese influence in the early 1930's had led to a cultural vacuum within Brazil. Waves of Japanese, German, and Italian immigrants and increased trade with Russia were the catalyst for the rise of three major interest groups: Nazi Germany, Imperial Japan, and Soviet style communists. Further, the Vargas' administration likened itself to Mussolini's Italy.⁴⁵ The influence of these interest groups were a threat to the United States as World-War II broke out in Europe. The United States began a fierce competition with Germany to gain the support of Brazil. In September 1940, prior to the United States' official involvement in World War II, the U.S. financed and opened a steel plant in Volta Redonda in an effort to keep Brazil on the side of the Allies and to end trade with the Axis nations.⁴⁶

³⁹ See figure 19.

⁴⁰ See figure 19

⁴¹ Poelzl, Volker. Culture Shock: A Survival Guide to Customs and Etiquette (2006) 224

⁴² See figure 19.

⁴³ Deckker, Zilah. *Brazil Built* (2001) 13

⁴⁴ Hernandez, Felipe., Millington, Mark., Borden, Iain., Eds. Transculturation: Cities, Spaces and Architectures in Latin America (2005): 144-147

⁴⁵ Deckker, Zilah. *Brazil Built* (2001) 21

⁴⁶ (97-99)

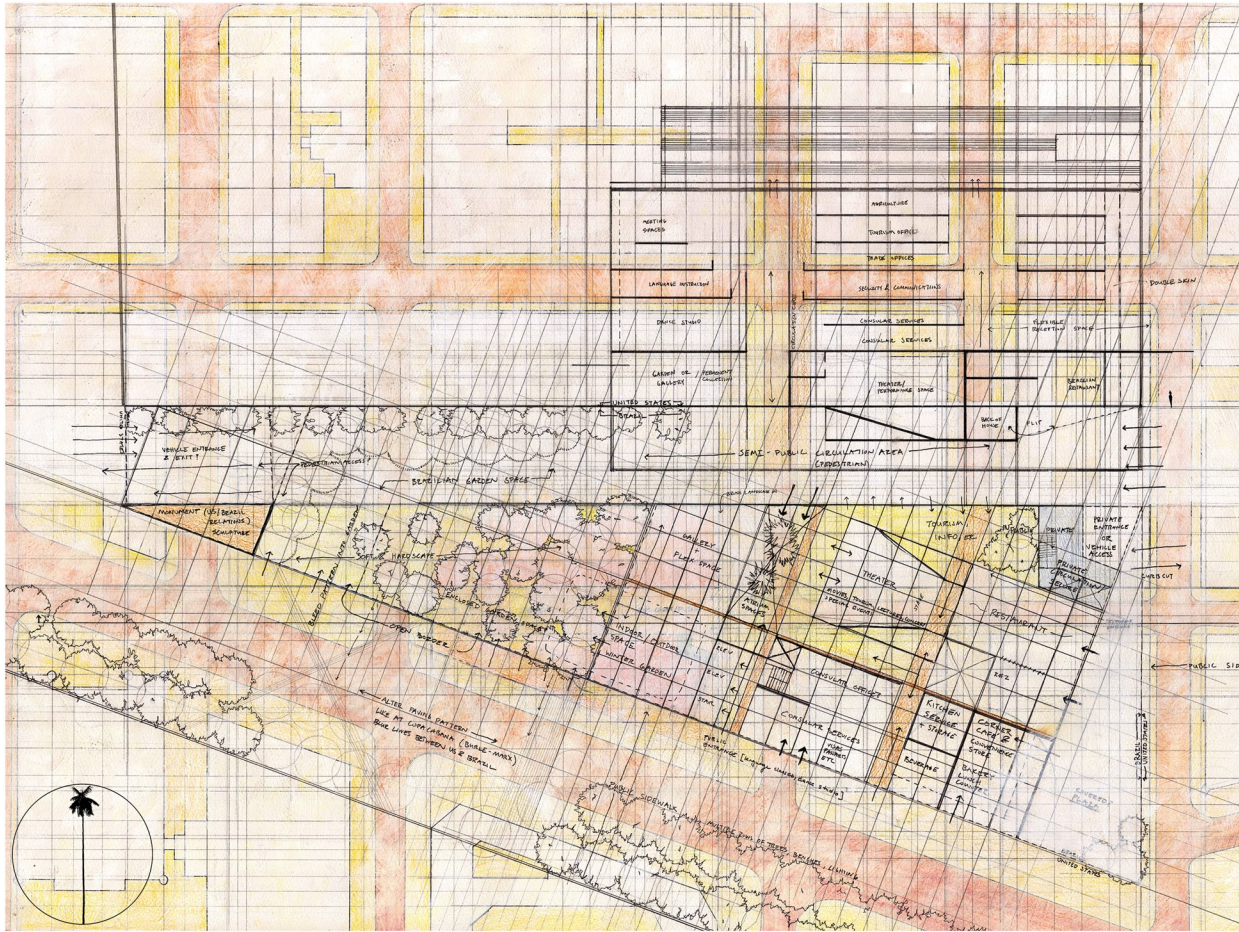
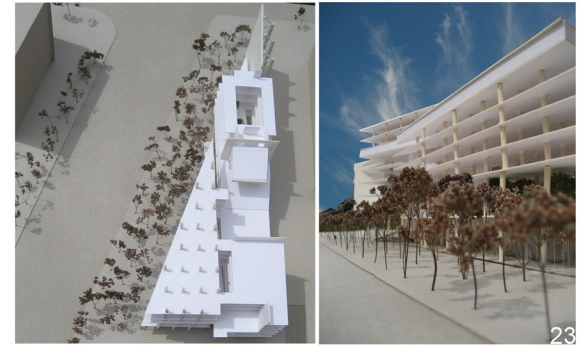


Figure 34: (Left) Ground floor at two scales and building section.

Figure 35: (Above) A Expressão Abstrata (The Abstract Expression), Sao Jose dos Campos, Brazil.

Figure 36: (Below) View of Embassy/theater level and view up Pennsylvania Avenue from street level.



In March of 1942 negotiations lead to a deal that allowed US troops to be stationed in Northeast Brazil and in return the US lent \$100 million for steel plants and \$200 million in credit toward equipping the Brazilian armed forces. Later in 1943, Franklin Delano Roosevelt met with Vargas at Natal aerial base where American fighter planes could fly directly over the Atlantic to Dakar and then throughout Europe. Brazil also directly entered the war by sending troops to fight in Italy.⁴⁷

Part of the United States' diplomatic mission to Brazil during WWII included a trip by Philip Goodwin and his staff from the Museum of Modern Art. Goodwin's book, *Brazil Builds*, was published in 1943 by The Museum of Modern Art, which also put together the New York exhibition and traveling exhibition. The book documented both the historical architecture of Brazil and the wave of modern architecture that had developed in the mid 20's, 30's and early 1940's. Chief among the architects showcased was Oscar Niemeyer who gained instant prominence for his Carioca (Rio De Janeiro) style. Niemeyer and others, believing that they had created a uniquely Brazilian style, had little incentive to use steel and instead focused on the sinuous curves available by the use of reinforced concrete. Others like Villanova Artigas rejected steel construction because of its association with Brazil's involvement in the war and believed that the steel plant was bought with Brazilian blood. Furthermore, he believed technology like steel was the cause of the massive destruction of World War II including the war machines, bombs, and tanks. Artigas also believed that the imperialist United States orchestrated the rise of Oscar Niemeyer and that Le Corbusier's influence cast Brazil in a dependent status with Europe because Brazilian architects copied not translated Le Corbusier and the European Modernists. Artigas believed that "Brazilianess" could be found in the technological innovations possible using reinforced concrete and extensive engineering.⁴⁸

My design retains the idea that reinforced concrete as a structural system is integral to achieving a Brazilian atmosphere. The building also makes use of the "laje" system of construction, which is still in use in Brazil. In the United States this method of building is commonly referred to as "lost tile" construction. Structural terra cotta block walls are also an important aspect of contemporary Brazilian construction. I have chosen to use the laje construction method in the south wing and structural terra-cotta block between poured concrete slabs at the north block.⁴⁹ The south face of the north block is to be clad with the azulejos in order to reflect light from the north as people in the southern hemisphere would

⁴⁷ Hirst, Monica. *The United States and Brazil: A Long Road of Unmet Expectations* (2005): 14

⁴⁸ Hernandez, Felipe, Millington, Mark., Borden, Iain., Eds. *Transculturation: Cities, Spaces and Architectures in Latin America* (2005): 149-151

⁴⁹ See figure 73 and 74.

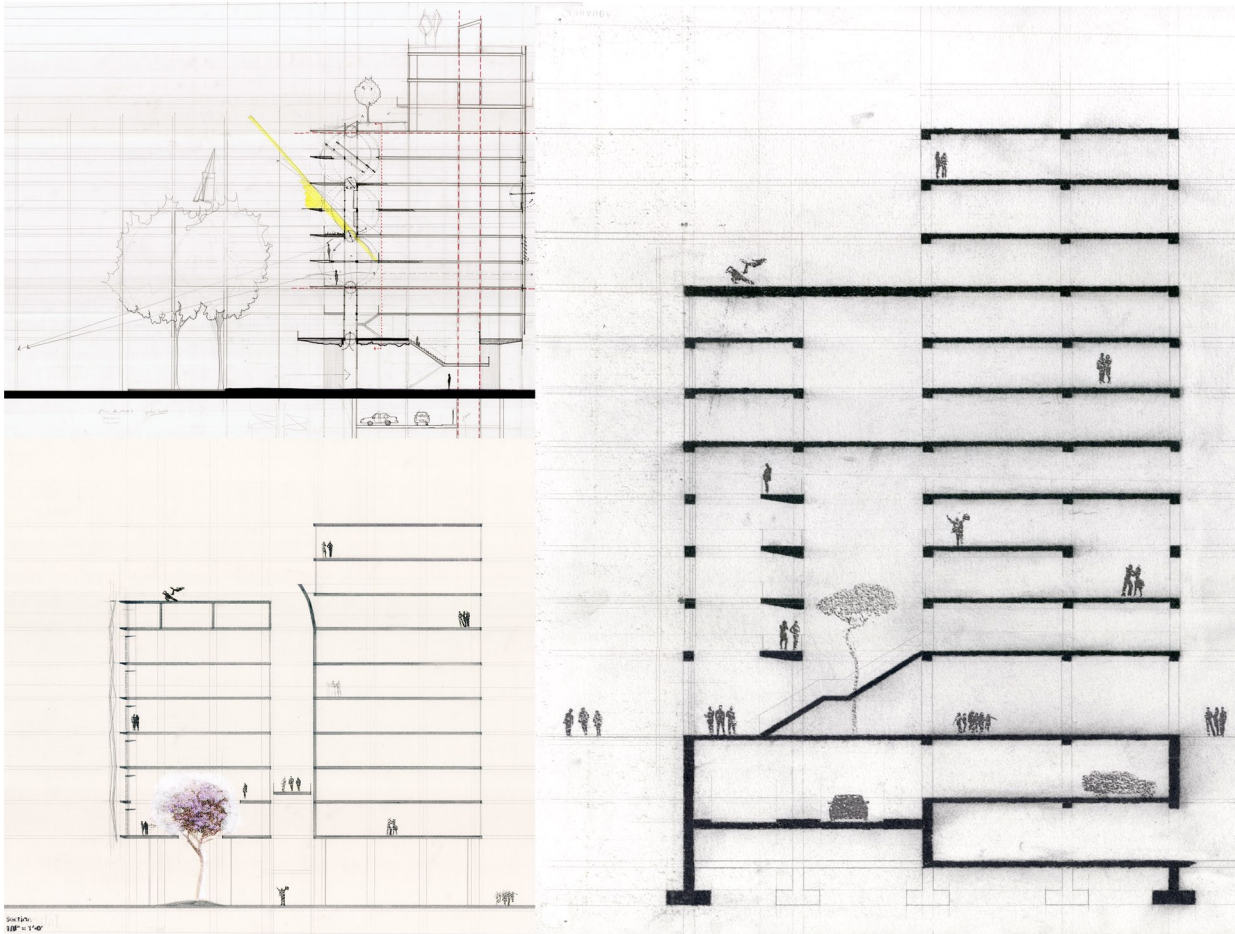


Figure 37: (Left) Process sections looking West.

Figure 38: (Above) *O Vácuo* (The Void), Hotel Maksoud Plaza, Sao Paulo, Brazil.

Figure 39: (Below) View of Western atrium.



expect.⁵⁰ The ventilating dual skin of the Pennsylvania avenue facade is also an important element of the design's material pallet. The system is able to capture and vent warm air during the summer and the metal fabric and operable sunshades are also used to temper the sun. In the winter, the dual skin acts like a greenhouse and traps the heat within its two layers. The sunshades can be adjusted to let in solar heat when needed.⁵¹

Marking Domain

One of the most important issues when dealing with an embassy project is that of domain. Embassies are considered to sit on the land of the embassy's home country and are surrounded by their host country. Sometimes, as in the case of the House of Sweden, this threshold can be multi-dimensional. The House of Sweden includes cultural functions that are not part of the official Embassy complex and are thus within the District of Columbia. The line of sovereignty therefore runs in both plan and section. My proposal for the Brazilian Embassy and Cultural Institute is equally complex.⁵²

The symbolic boundary between the United States and Brazil is even more complex and has to do with international affairs, economics and politics. It also has to do with the layers of security around an embassy, which are commensurate with perceived threat levels, world standing, and, of course, politics. Many of the new U.S. Embassies around the world are characterized by their layers of security including perimeter walls around a large complex, setbacks from the wall, blast proof buildings, security processing buildings, armed Marine guards, security cameras, and gates.

The aim of my project was to engage the public at large with Brazilian culture. I wanted to very literally bring the public into the building without feeling as if they had left Pennsylvania Avenue. The solution was to create a public ramp that weaved its way both horizontally and vertically through the center of my building. The ramp would be a figural extension of the DC sidewalk and would disarm the sense of high security and inaccessibility associated with embassy buildings. The ramp, which is open to the elements, would allow access to the more public functions of the Brazilian Embassy and Cultural Center at each landing. It terminates at the fifth floor viewing deck, which projects out over the 9th Street sidewalk.⁵³ The top of the ramp also offers access through a

⁵⁰ See figure 71

⁵¹ See figure 73

⁵² See figures 70-72.

⁵³ See figure 58 and 71.

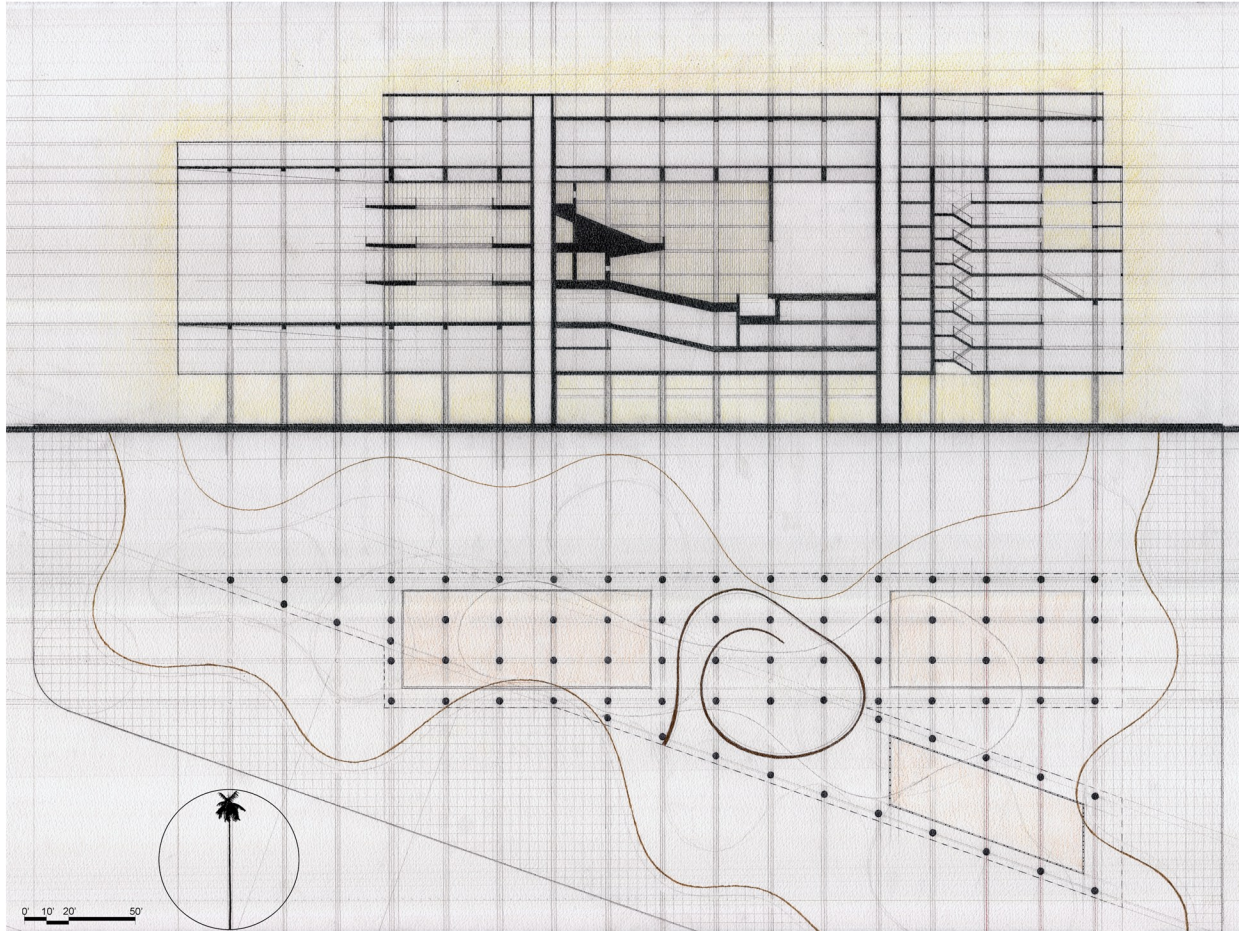


Figure 40: (Left) Studies of ground floor plan and transverse section.

Figure 41: (Above) *A Ecologia Holística* (The Holistic Ecology). Santos Dumont Park, Sao Jose dos Campos, Brazil.

Figure 42: (Below) Structural grid, site trees, and ground level enclosures.



security checkpoint and into the Embassy portion of the building complex.⁵⁴ Another small entrance on the ground floor also provides elevator access for those who can't manage the ramp.⁵⁵ The technical area that is Brazilian territory is thus a very small footprint on the ground floor that extends vertically with an elevator shaft and adjacent egress stairs to a main body, which encompasses three levels on the east half of the building.

Creating Order

Order is also an important element of design, which often begins with the site and site conditions. Order is especially critical on an irregular site, such as the triangular one I chose for the Brazilian Embassy and Cultural Institute. The site has two axis to manage: that of Pennsylvania Avenue and the regular orthogonal DC grid. The design of the complex was a constant struggle to contain the collision of these two systems, which can be seen as analogous to the collision of two cultures. Previous design iterations were centered on two main building blocks: a north wing that was ordered around the DC grid and a south wing that used the angle of Pennsylvania Avenue for its structural grid⁵⁶. The intersection of these two systems, however, never translated into a more complex and rich design but instead resulted in a cacophony of columns. Other variations of intersecting these grids denied the complexity because they made hierarchical relationships less distinct. The solution to this problem was the creation of one grid system (a field) that allowed: figures to emerge, the formation of hierarchies, and the development of complexities especially at thresholds, intersections, and areas of overlap.⁵⁷

Order is also established by the rhythm of the ramp leading to all of the public functions of the building. The twelve-foot wide ramp procession begins on the sidewalk and rises twelve feet over the course of fifty feet leading to a twelve-foot landing. This rhythm is repeated four times setting up the expectation of twelve foot slab-to-slab heights. My design uses breaks in this order to signify congregation, hierarchy, and connected functions. The gallery is a double height space for the entire length of the south wing, which gives the form a base and provides a semi-public destination easily recognizable and reachable from the street⁵⁸. Order in the north wing begins with the column grid system for the first two levels and then morphs into load-bearing walls, based on the same grid system. The ninth floor is a series of chord trusses, which allow for the large column-free

⁵⁴ See figure 58.

⁵⁵ See figure 54.

⁵⁶ See figure 34.

⁵⁷ See figures 42, 48, and 54.

⁵⁸ See figures 37 and 56-57.

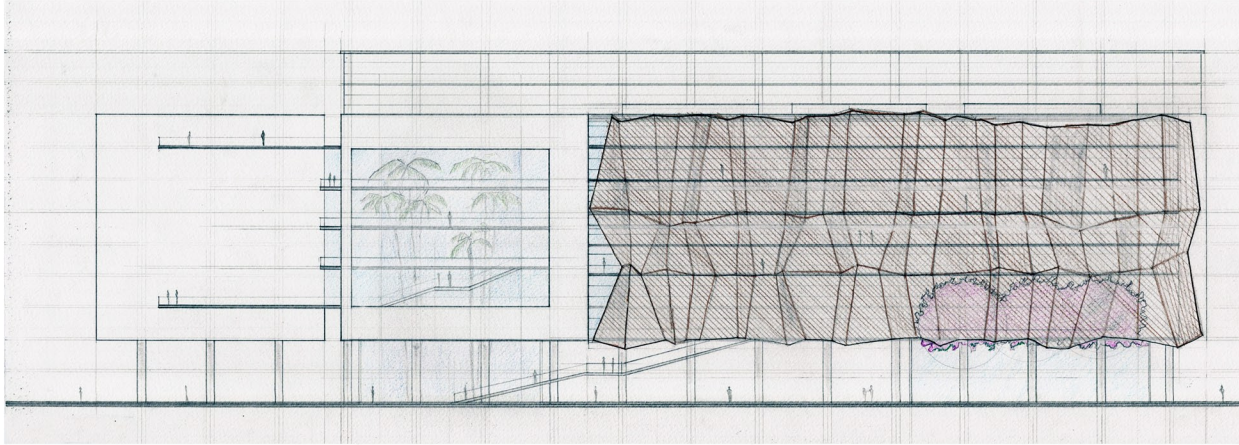


Figure 43: (Left) Studies of Pennsylvania Avenue elevation.

Figure 44: (Above) *A Viagem* (The Voyage). Replica Airplane. Santos Dumont Park, Sao Jose dos Campos, Brazil.

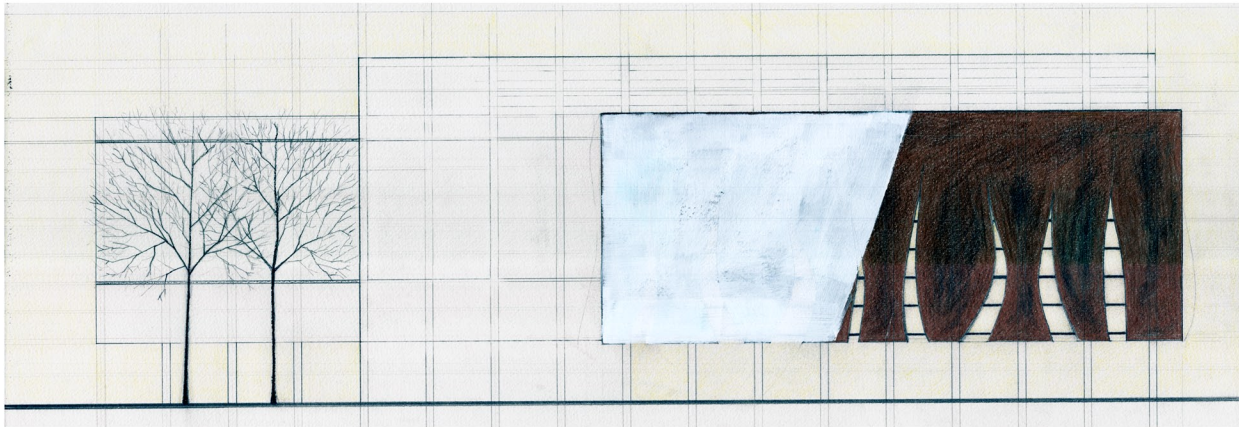
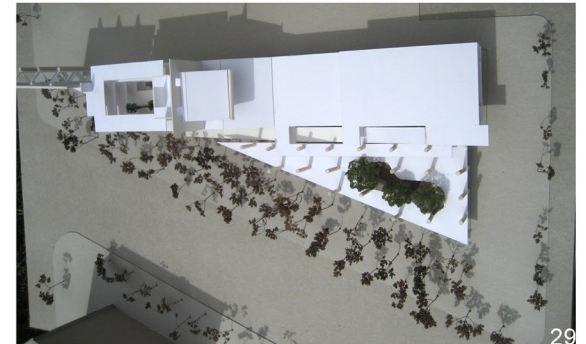


Figure 45: (Below) Winter gardens and ramp stitched through building.



theater and atrium spaces. The trusses provide physical separation from the embassy/theater and the residences. The residences are thus free from the strict order below and able to take on a form related to their particular needs.⁵⁹

Translating the Idealized Landscape

In my design, the idealized landscape of Brazil is captured in two winter gardens. The two main types of trees found in the building are the acai palm and the quaresmeira. Acai palms are generally found in the Brazilian swampland and flood planes including the Amazon rainforest. Acai berries are naturally rich in antioxidants and are used in ice cream and smoothies. The quaresmeira tree (called Purple Glory-Tree in the US) is found mainly in southeastern Brazil. This tree blooms a bright purple (the Lenten color) during the season of Lent and is used as an ornamental tree in urban settings.⁶⁰

Winter gardens are necessary in my proposed building because of the climate differences between the United States and Brazil. I decided that, while the field of columns might act like a field trees, they would be just as naked as deciduous trees during the winter months, a depressing time for Brazilians because of the loss of bright colors, the lack of sun, and the cold weather. The acai palms would be planted amongst a pond containing Brazilian water lilies and the quaresmeria trees would loom over a bed of orchids.⁶¹ These idealized landscape conditions would provide a retreat for Brazilian citizens and employees of the Embassy and Cultural Institute. District residents and tourists would also be able to relax in the gardens while learning about the plant life of Brazil.

The relationship to the sun from the north is an important part of the Brazilian way of life. Aside from some important government buildings and hotels for tourists, the majority of Brazilian buildings are not air conditioned or heated. This demands a greater effort to mitigate solar heat gain. Use of sun shading devices, layers of windows, and ventilation are essential. Additionally, I thought it important to bring in the sun from the north instead of the south as is natural in the northern hemisphere. The ledge within the dual-skin system would also provide for gardens that shield the sun in summer and allow the sun to pour in during the winter. The plants could be shrubs and ornamental trees.⁶² In my design for the Brazilian Embassy the idealized landscape of the cerrado (tropical savannah

⁵⁹ See figures 63-64.

⁶⁰ See figures 37, 43, and 66.

⁶¹ See figures 33, 42, 48, 45 and 54.

⁶² See figure 73.

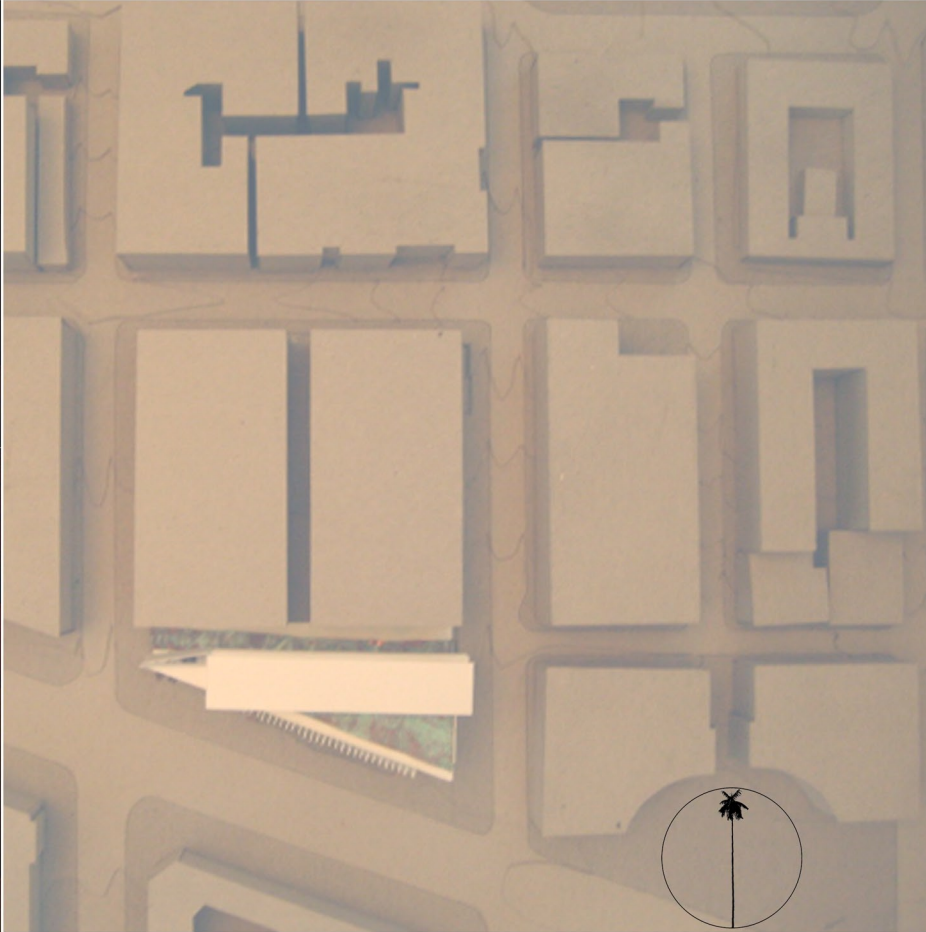
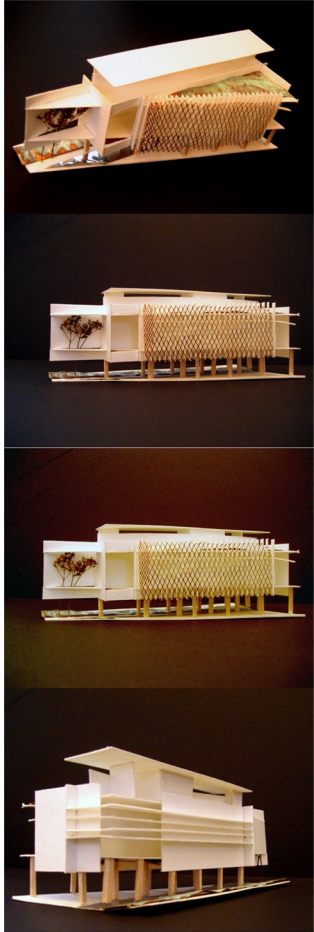


Figure 46: (Left) Context and study model.

Figure 47: (Above) *A Peregrinação* (The Peregrination). Pilgrimage to Aparecida Basílica, Aparecida, Brazil.

Figure 48: (Below) View of ground level footprint and view from Northwest corner of site looking Northeast.



on the high plateau) is translated into the roof garden over the south wing and is accessible from the residences on the tenth floor.⁶³

Translating Ecology

The idealized landscape also merges with the concept of domain as part of the worldwide movement toward ecological awareness and responsibility. Sixty percent of the Amazon rainforest is within Brazil. This ecologically sensitive area is being slowly deforested by Brazilians who clear cut swaths of forest to have land for cattle to graze or to plant soybeans. This behavior not only threatens the abundant flora and fauna of the rainforest, but also is not fiscally sound. It has been shown that the value of natural fruits, vegetables, and felled timber are far greater than that of grazing lands and soy production.⁶⁴

In 1989, amid world-wide discussions about the importance of “saving” the Amazon, Al Gore was quoted as saying that “contrary to what Brazilians think, the Amazon is not their property, it belongs to all of us.”⁶⁵ To this and other attempts to subvert Brazilian sovereignty, current Brazilian President Luiz da Silva said, “The world needs to understand that the Amazon has an owner, and that is the Brazilian people. They are the rubber tappers, fisherman, and us who are Brazilian.”⁶⁶ Needless to say there are major differences of opinion on this matter. The differences over sovereignty can, however, play a role in the physical relationship between Brazil and the United States within the District of Columbia.

In my design, the footprint of the Brazilian Embassy and Cultural Institute is really and metaphorically an ecological footprint and part of a social contact between the Brazilian people and the rest of the world. My design includes a sinuous line that slices through the ground plane all around the constructible area of the site. The area within the amorphous form is 4.1 million square inches, or one square inch for every square kilometer of rainforest in Brazil. Subsequent lines track the contracting area of the rainforest, year by year.⁶⁷ In 2008, only 3.4 million square kilometers of the rainforest remained. This sets up the possibility that the ground floor area of the building could slightly contract every year. If current trends continued the building would lose seventy-seven square feet of ground floor

⁶³ See figures 51, 63.

⁶⁴ Rainforest Trust Inc. <http://www.rainforesttrust.org/library/rainforest-info-10.html>

⁶⁵ Barrionuevo, Alexei, “Whose Rain Forest Is This, Anyway?” *New York Times* (2008)

⁶⁶ Reuters. “Brazil’s Lula hits out at foreign Amazon critics”

www.reuters.com/article/environmentNews/idUSN2634763020080526

⁶⁷ See figure 54.



Figure 49: (Left) Clockwise from upper left, Christ Redeemer, Tree, The Sugar Loaf, Ibirapuera Park (Niemeyer), Churrascaria, Cheers, Spiral stairs (Levi).

Figure 50: (Above) A *Vida Brasileira* (The Brazilian Life). Feijoada.

Figure 51: (Below) Building massing.



area every year. A large portion of the ground floor and second floor is dedicated to providing information about the Amazon and how individuals can make a difference in its future.⁶⁸ Visitors would be able to see “rings” in the ground floor and year by year see how much area was lost to deforestation and what species are threatened.

Conclusion

In order to represent Brazilian culture in a meaningful way, I had to metaphorically consume it. I needed to collect and acquire enough of Brazil to be able to translate Portuguese into English. The way that I achieved my “diet” was through a liberal-arts education in all things Brazilian, much in the same way that Vitruvius argues that architects must have a well-rounded education outside of the traditional bounds of design and construction. My education, in part, included: language classes, the study of samba music and its pop variations, samba dancing and carnival, attending mass in Brazilian Portuguese, learning Brazilian history, keeping up with the ever-changing economics and politics of Brazil, and, most importantly, eating lots of Brazilian food. This education allowed me to more fully understand Brazilian architectural history, contemporary design in Brazil, and the construction methods utilized. This process has transformed me into a Washingtonian who is architecturally and otherwise empathetic toward Brazil. The product of my thesis, that which has changed substantively, is I, the American cannibal who consumed Brazilian culture in the process of becoming part of the transcultural discourse in architecture. The reflection of my metamorphosis is the design for the Brazilian Embassy and Cultural Institute. The final drawings and models presented at the defense of my thesis follow.

⁶⁸ See figures 54 and 55.

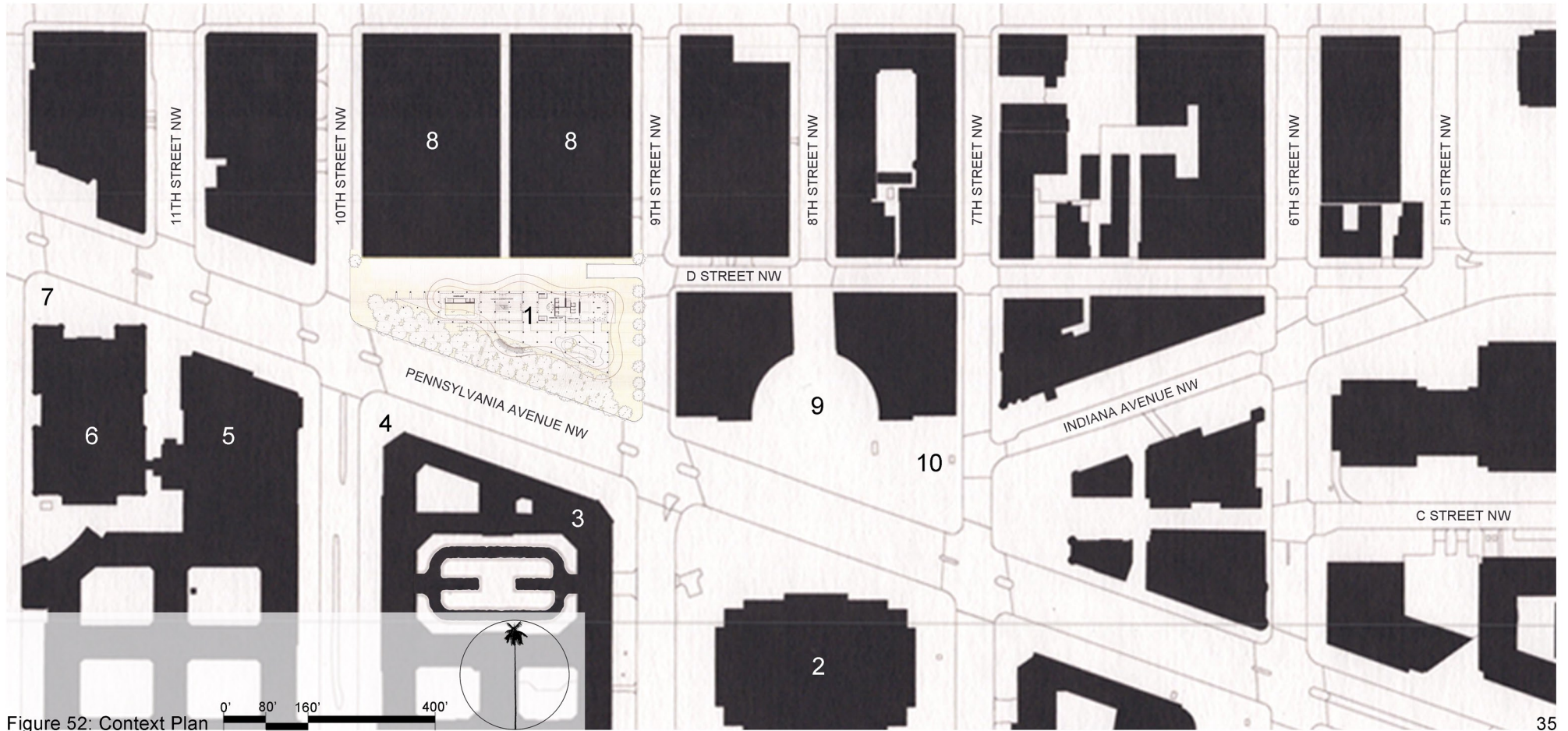


Figure 52: Context Plan

10 STREET NW

FIG. 68

D STREET NW (PEDESTRIANT ONLY)

FIG. 67

11

FIG. 71

FIG. 72

FIG. 70

FIG. 66

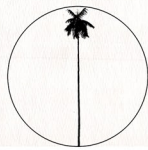
12

PENNSYLVANIA AVENUE NW

9TH STREET NW

FIG. 69

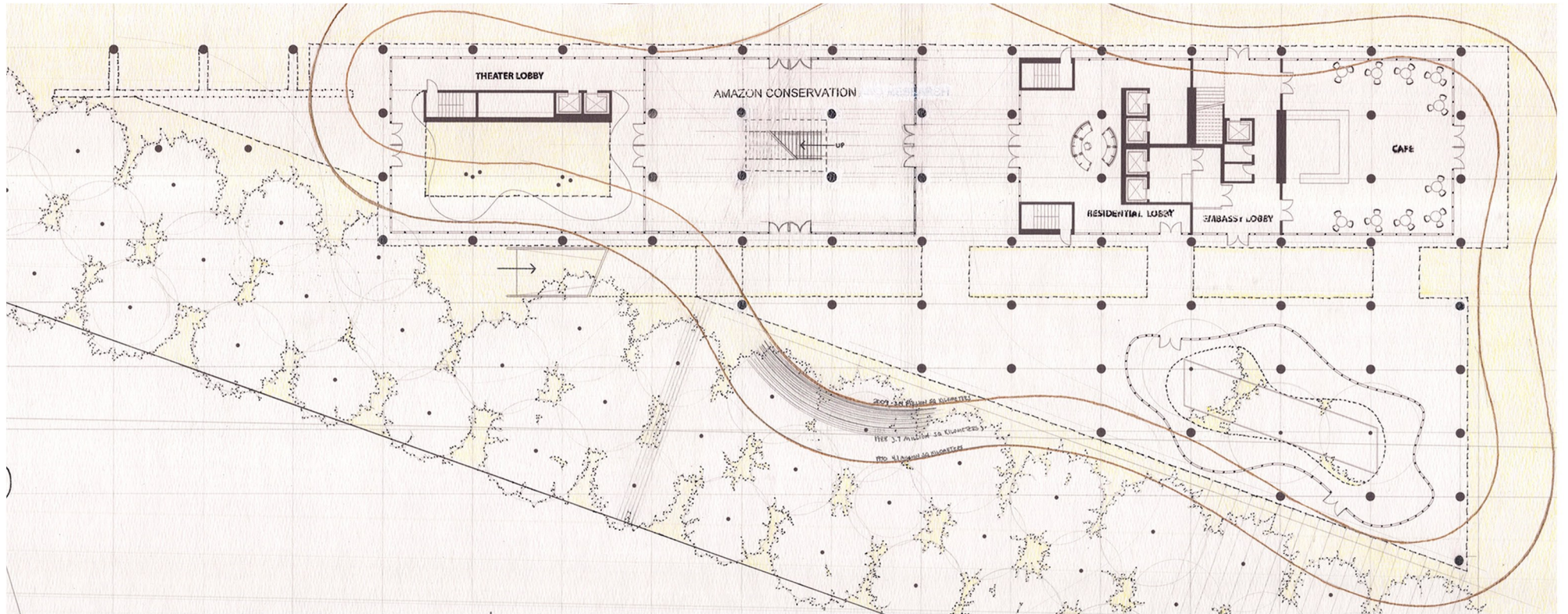
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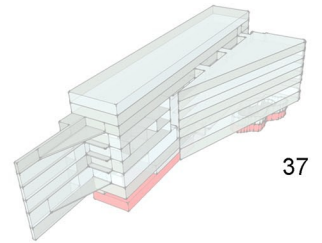
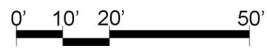
KEYNOTES:

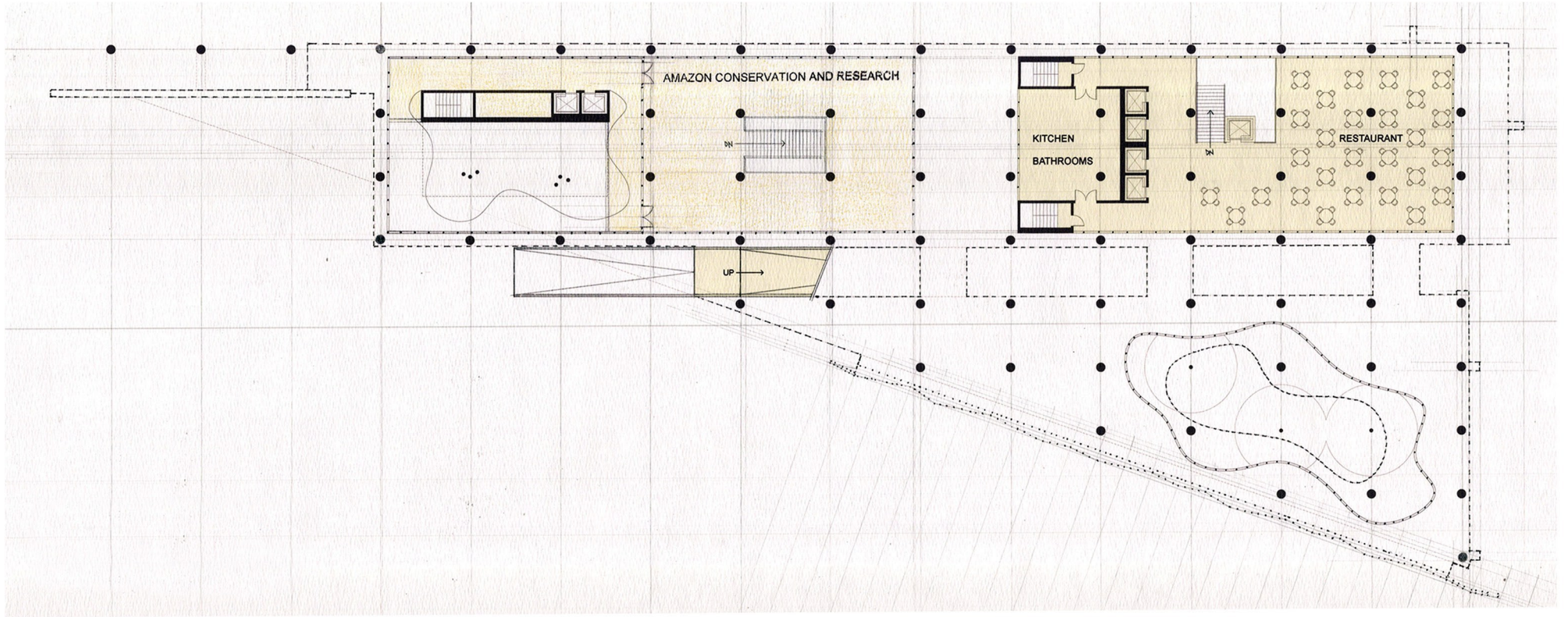
1. Proposed site for Brazilian Embassy and Cultural Institute.
2. National Archives.
3. Robert F. Kennedy Dept. of Justice Building.
4. Franklin Delano Roosevelt Memorial.
5. Dept. of Commerce Building at Federal Triangle.
6. Old Post Office Building.
7. Ben Franklin Statue.
8. Other buildings on J. Edgar Hoover Building site, per NCPC recommendations.
9. United States Navy Memorial.
10. Archives - Navy Memorial Metro Station.
11. Access to parking garage.
12. Lombardy poplar trees.

Figure 53: Site Plan

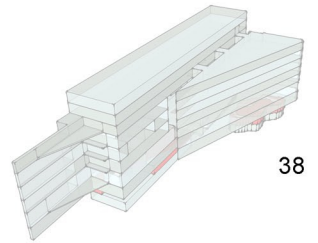


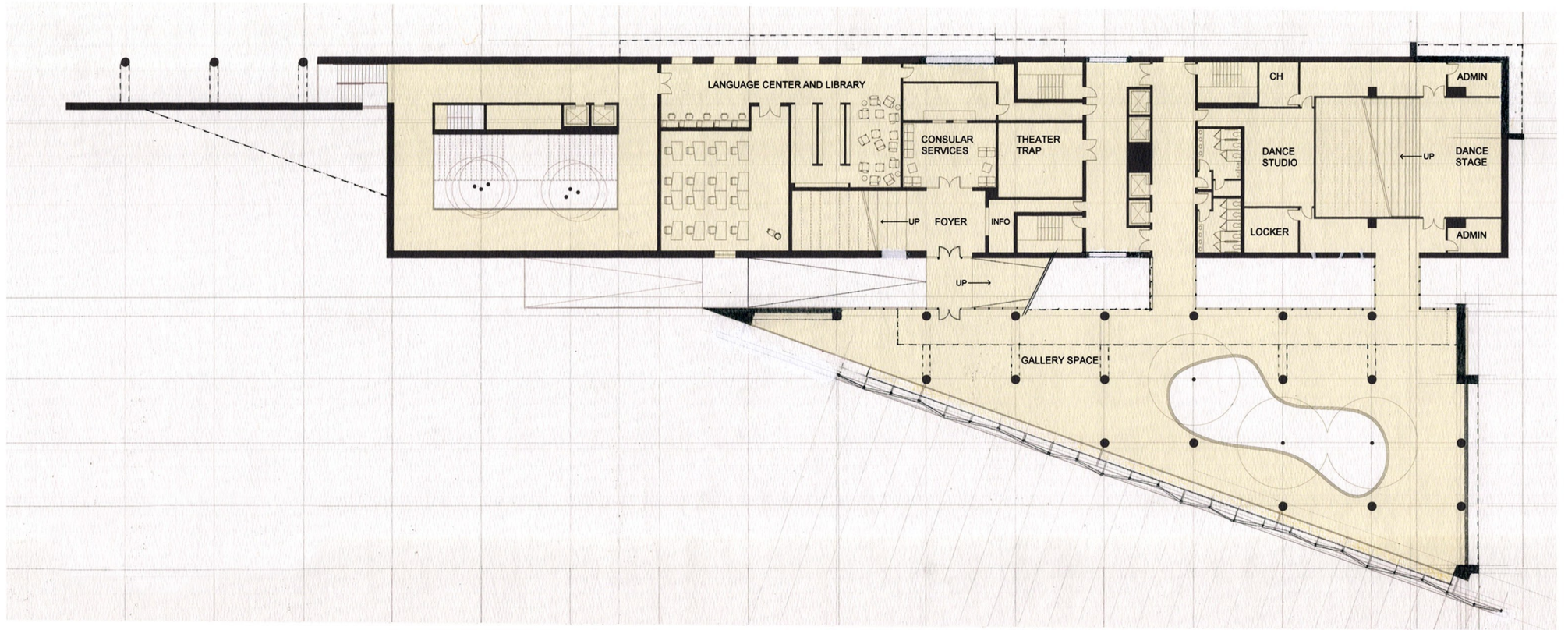
Final Plans:
Figure 54: Ground Floor Plan



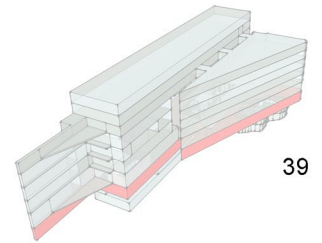
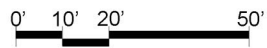


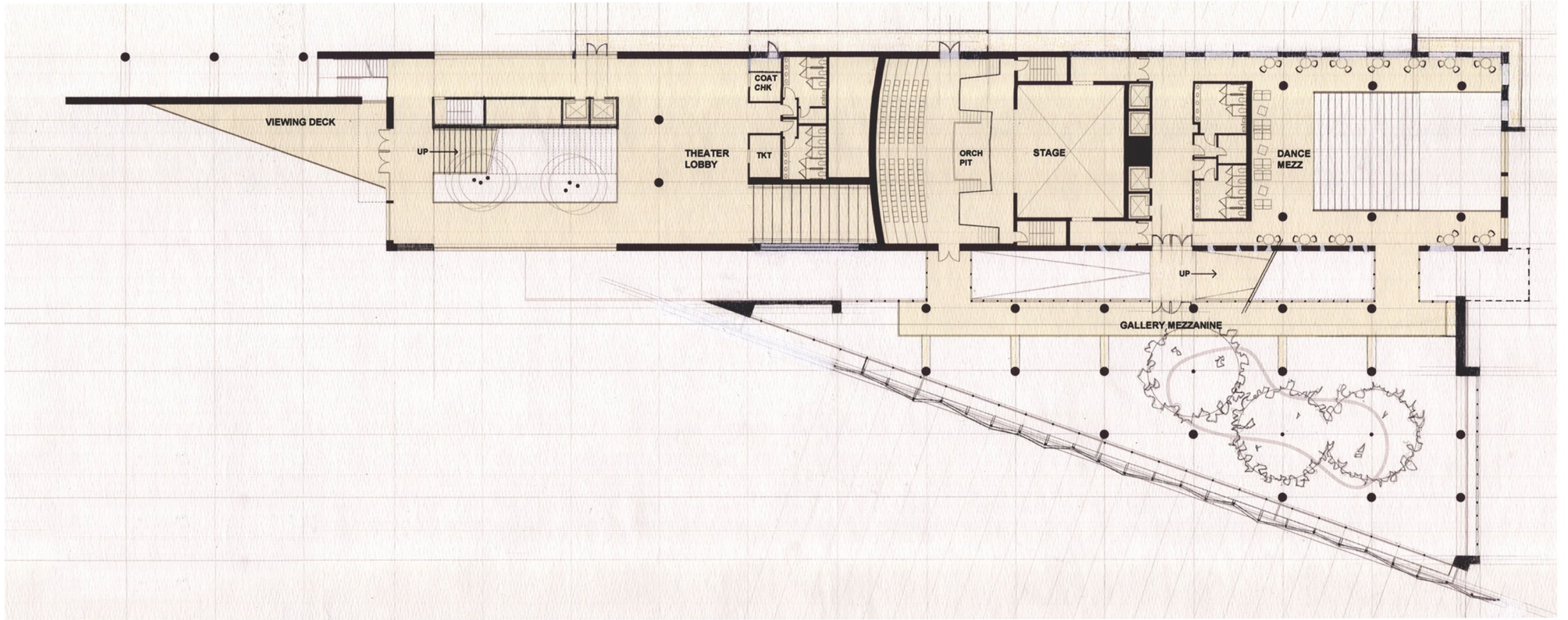
Final Plans:
Figure 55: Second Floor Plan



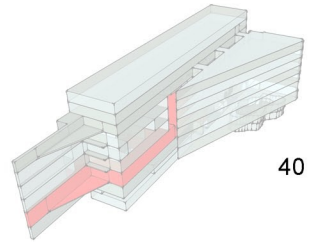
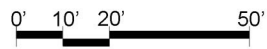


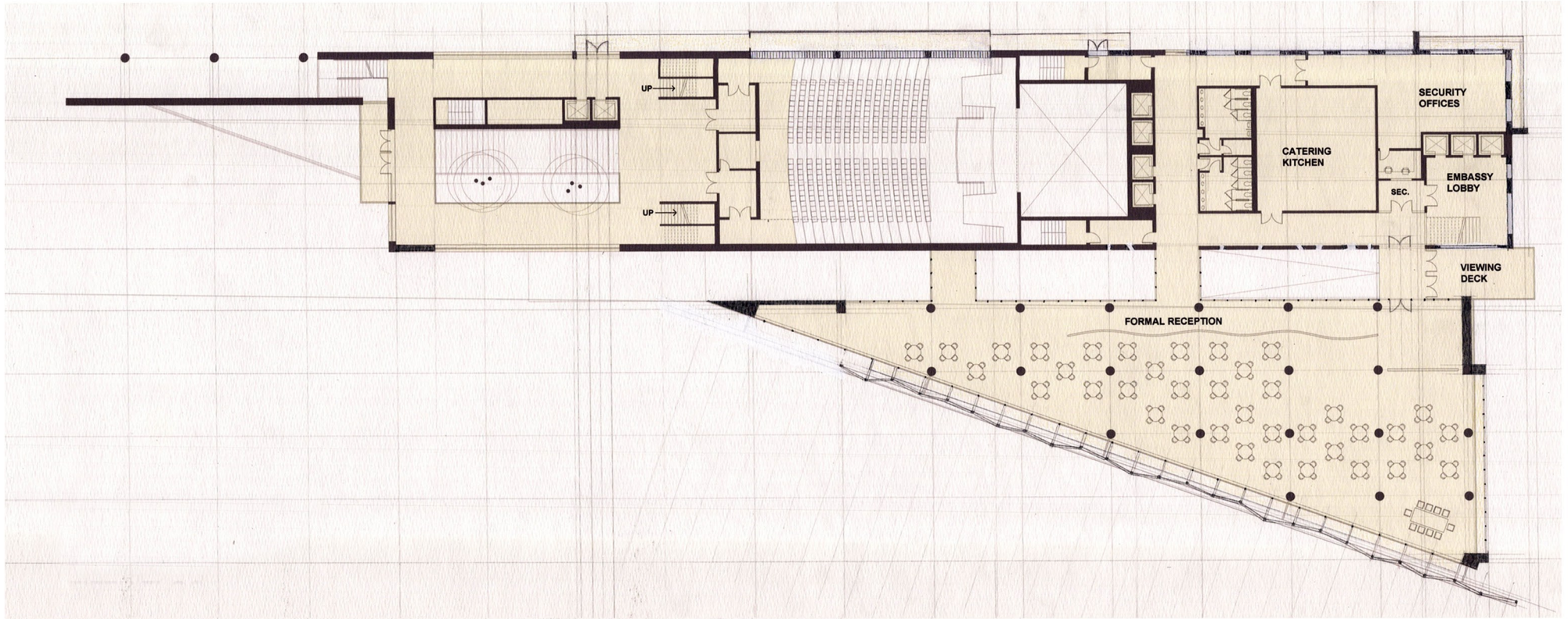
Final Plans:
Figure 56: Third Floor Plan



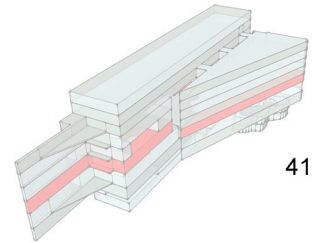
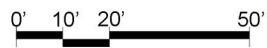


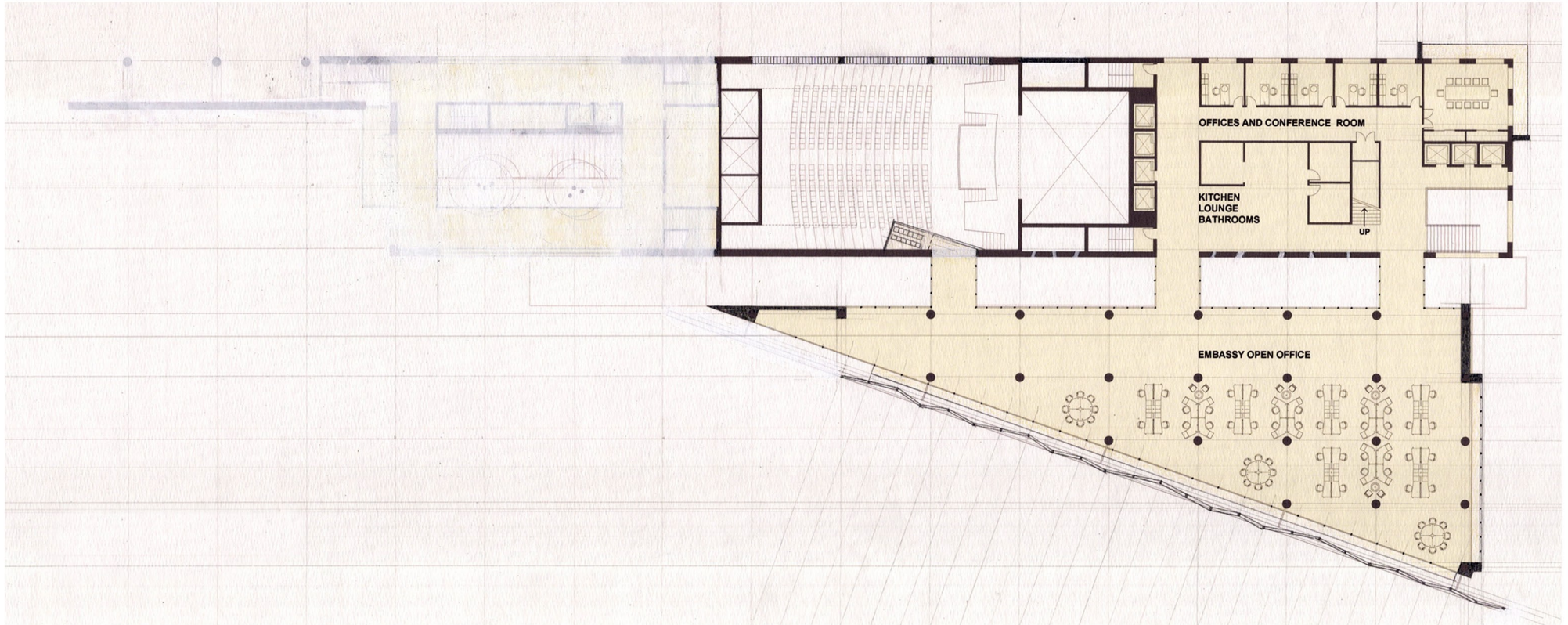
Final Plans:
Figure 57: Fourth Floor Plan



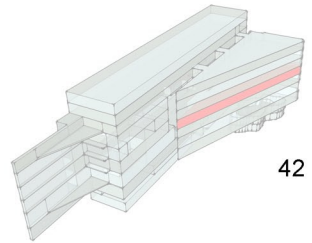


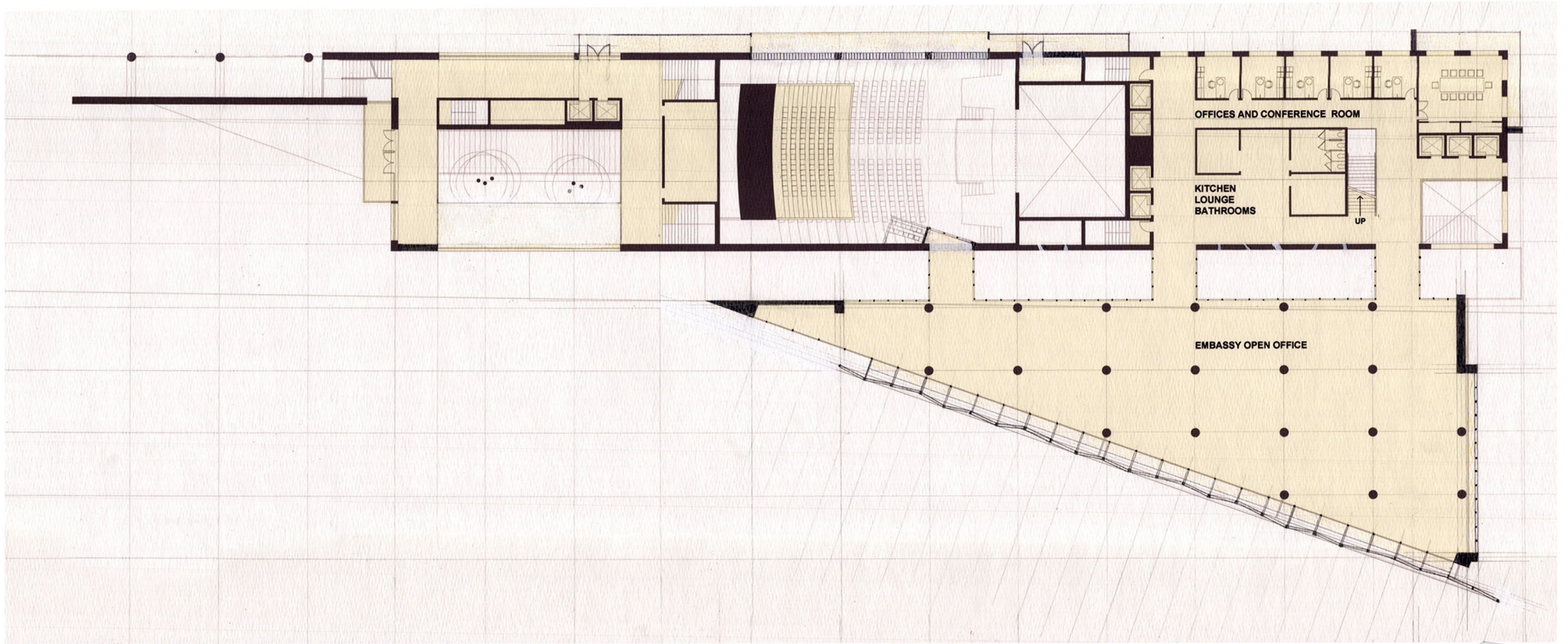
Final Plans:
Figure 58: Fifth Floor Plan



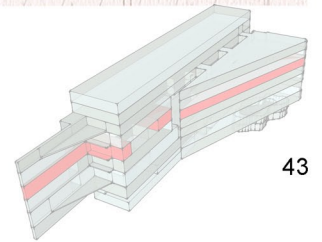
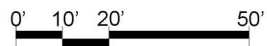


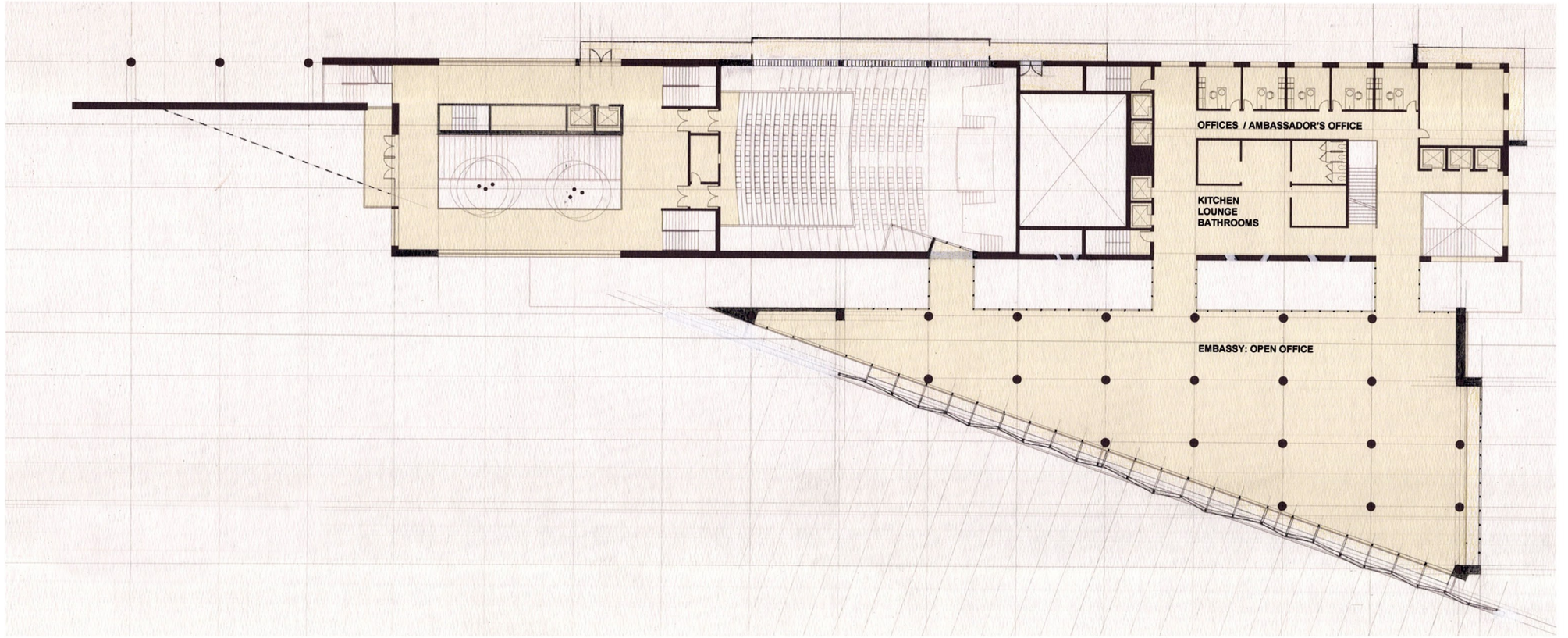
Final Plans:
Figure 59: Sixth Floor Plan



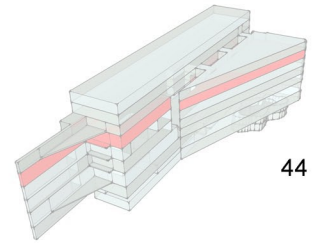
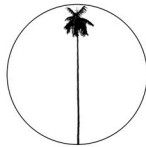


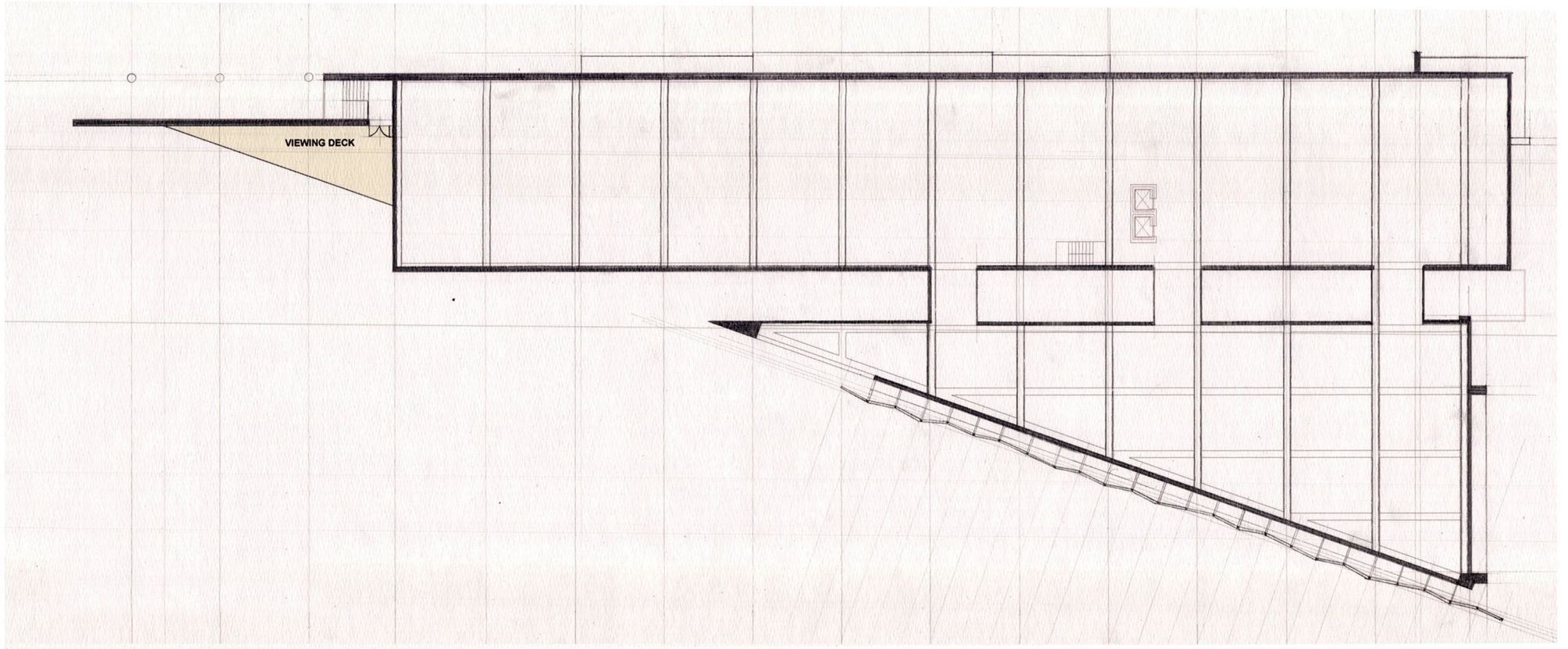
Final Plans:
Figure 60: Seventh Floor Plan



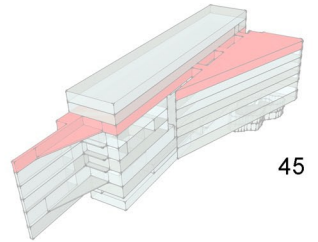
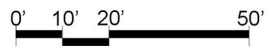


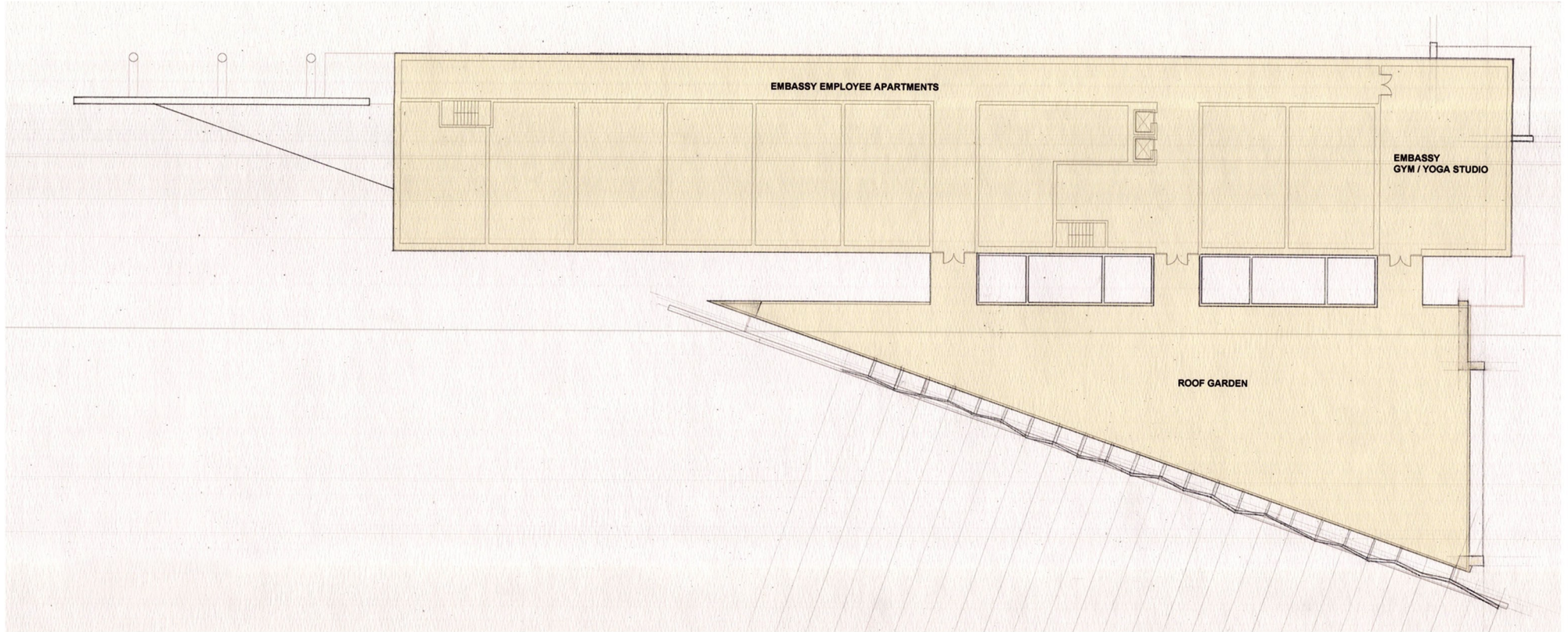
Final Plans:
Figure 61: Eighth Floor Plan



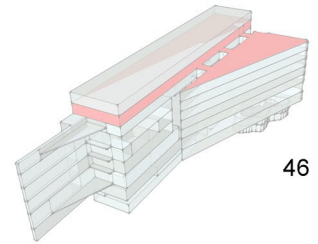


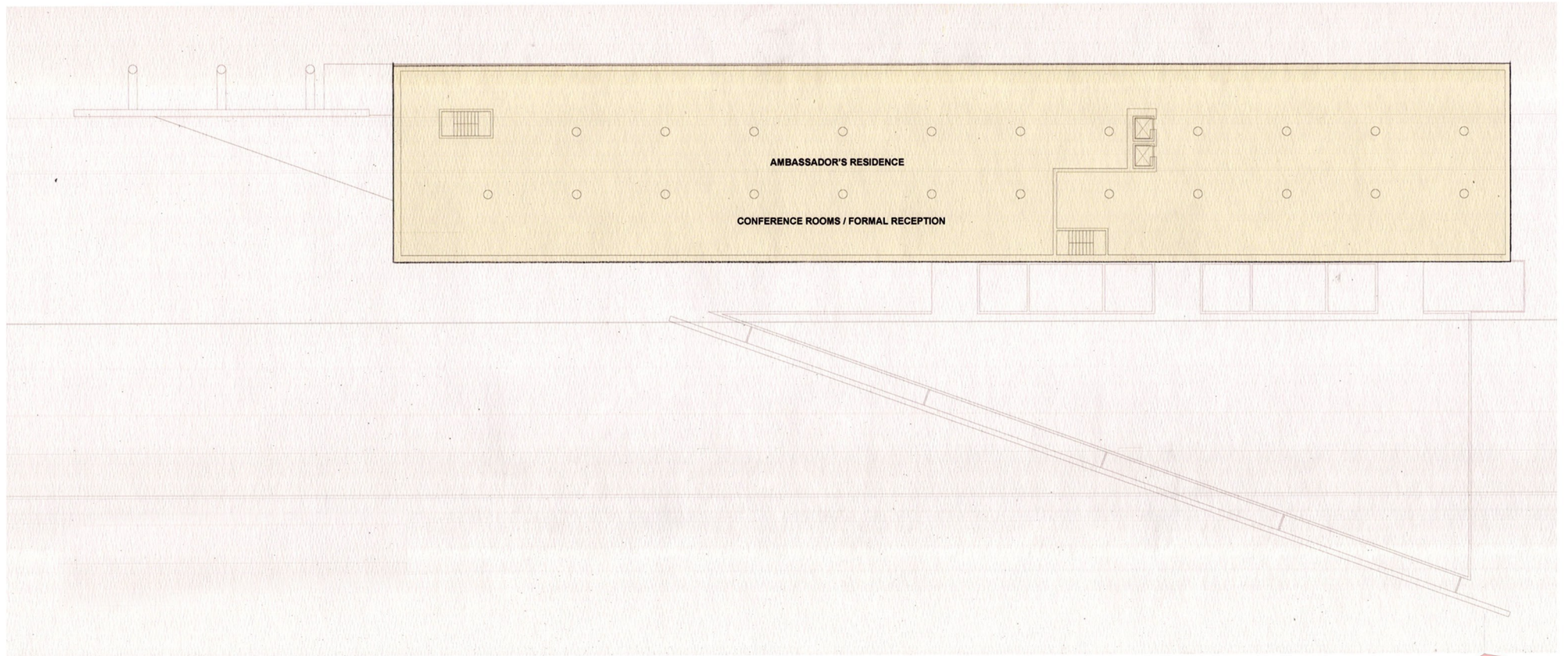
Final Plans:
Figure 62: Ninth Floor Plan



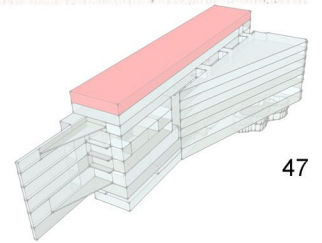


Final Plans:
Figure 63: Tenth Floor Plan



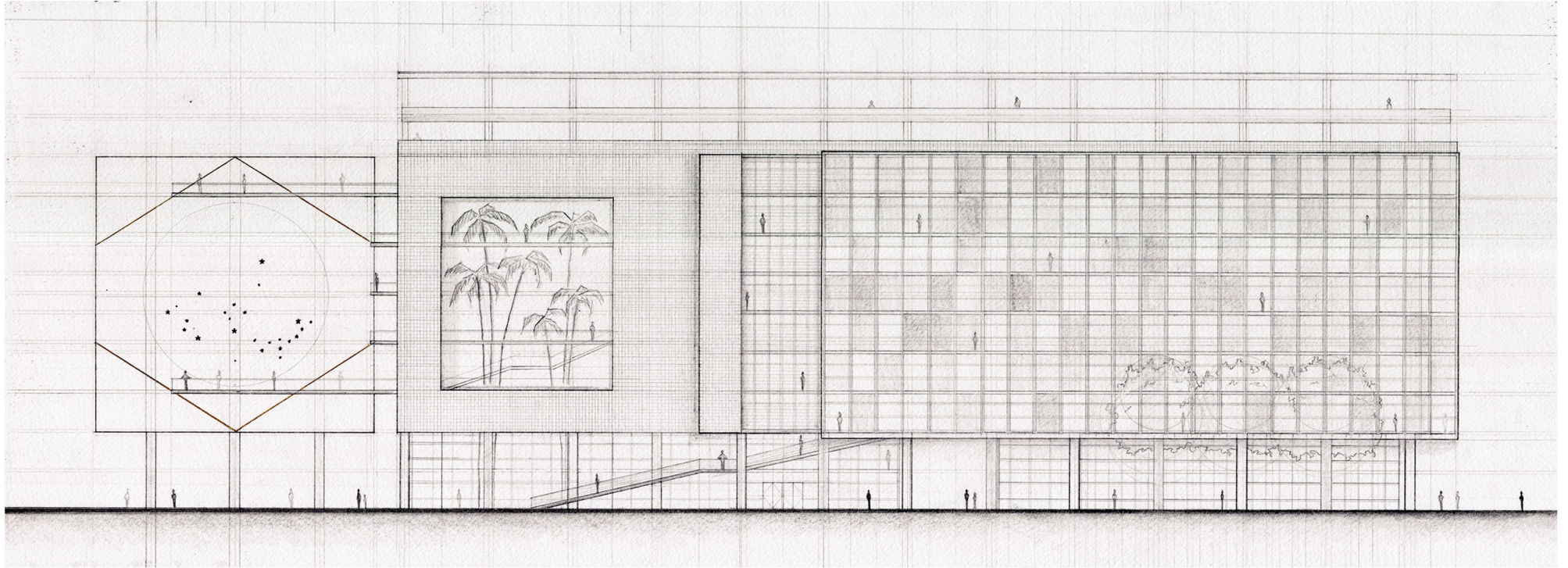


Final Plans:
Figure 64: Eleventh Floor Plan





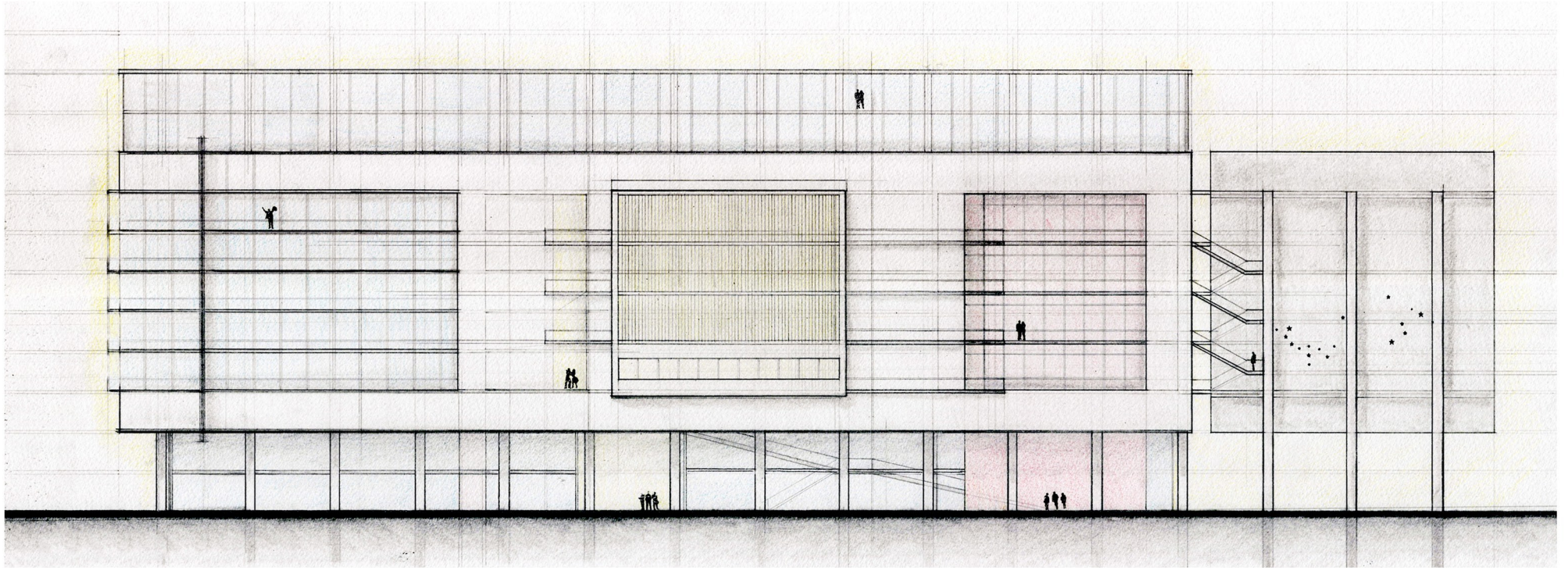
Final Model:
Figure 65: Pennsylvania Avenue view.



Final Elevations:

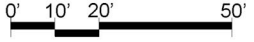
Figure 66: Pennsylvania Avenue NW (South) elevation

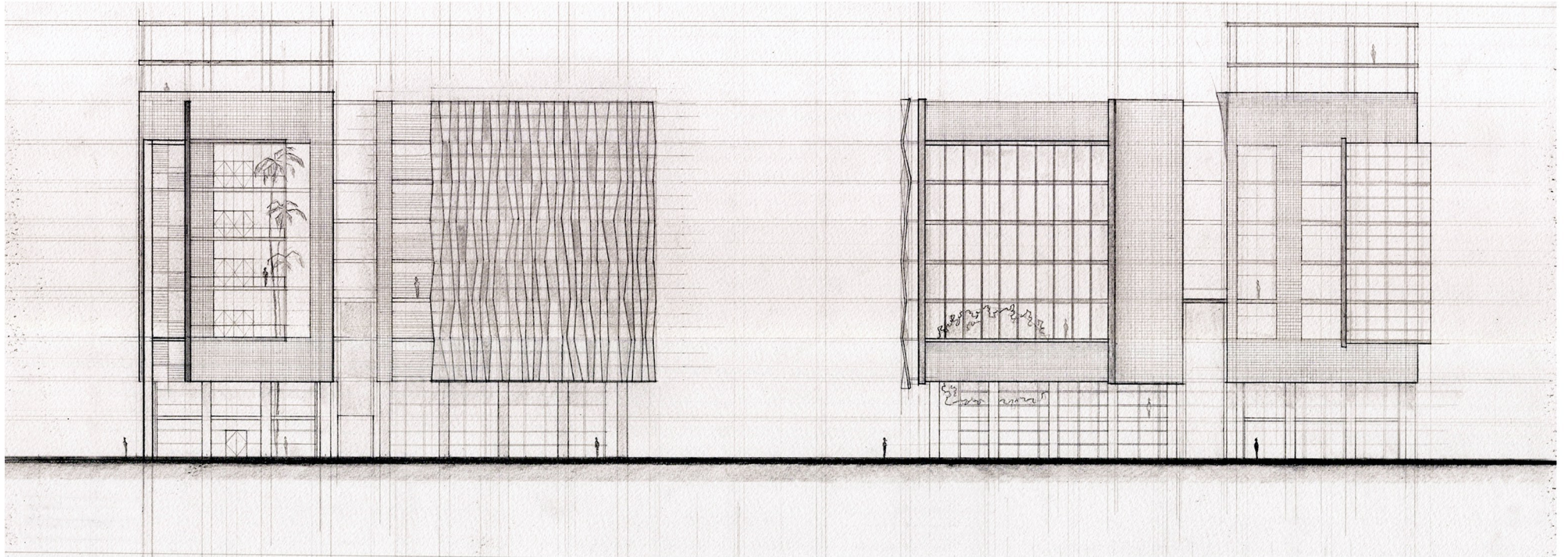




Final Elevations:

Figure 67: D Street NW (North) Elevation





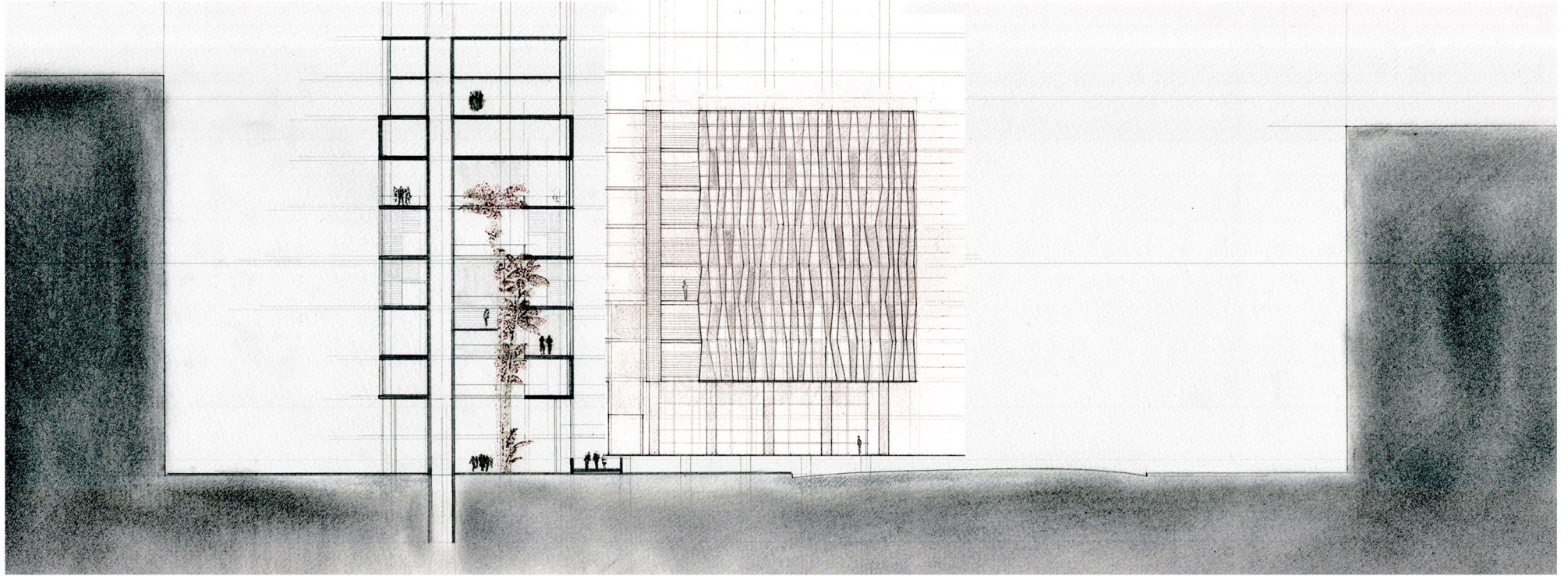
Final Elevations:

Figure 68: 10th Street NW (West) Elevation



Figure 69: 9th Street NW (East) Elevation

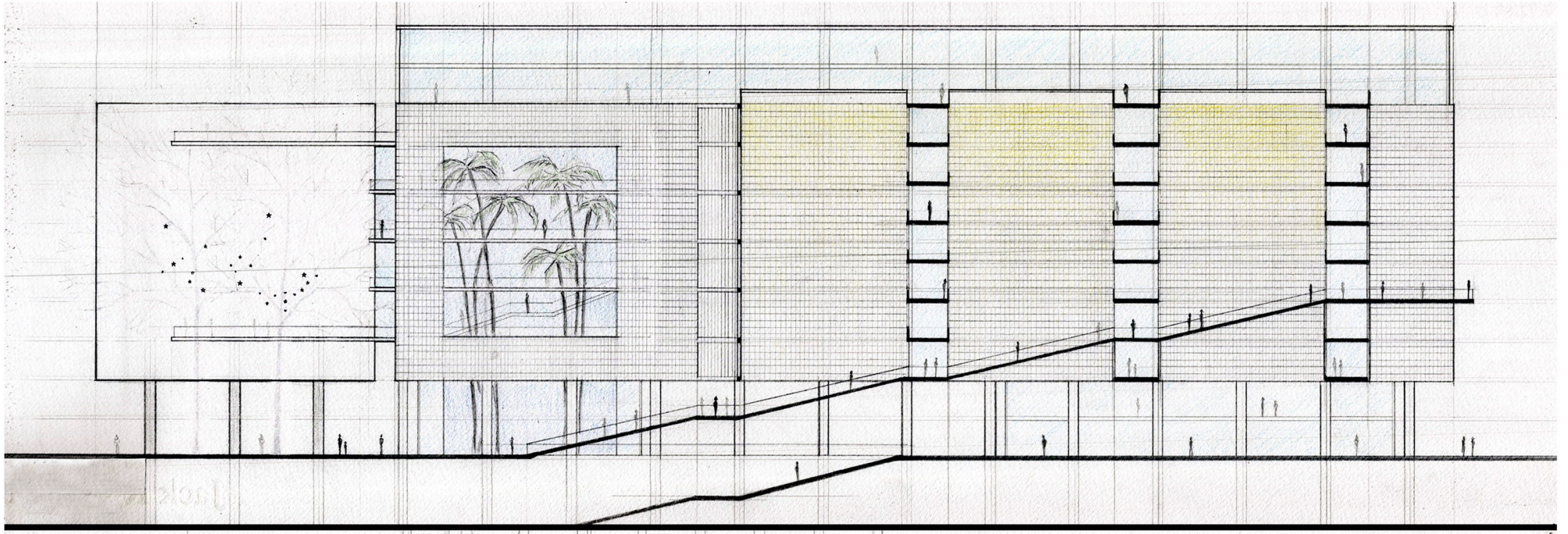




Final Sections:

Figure 70: Cross section through Western atrium

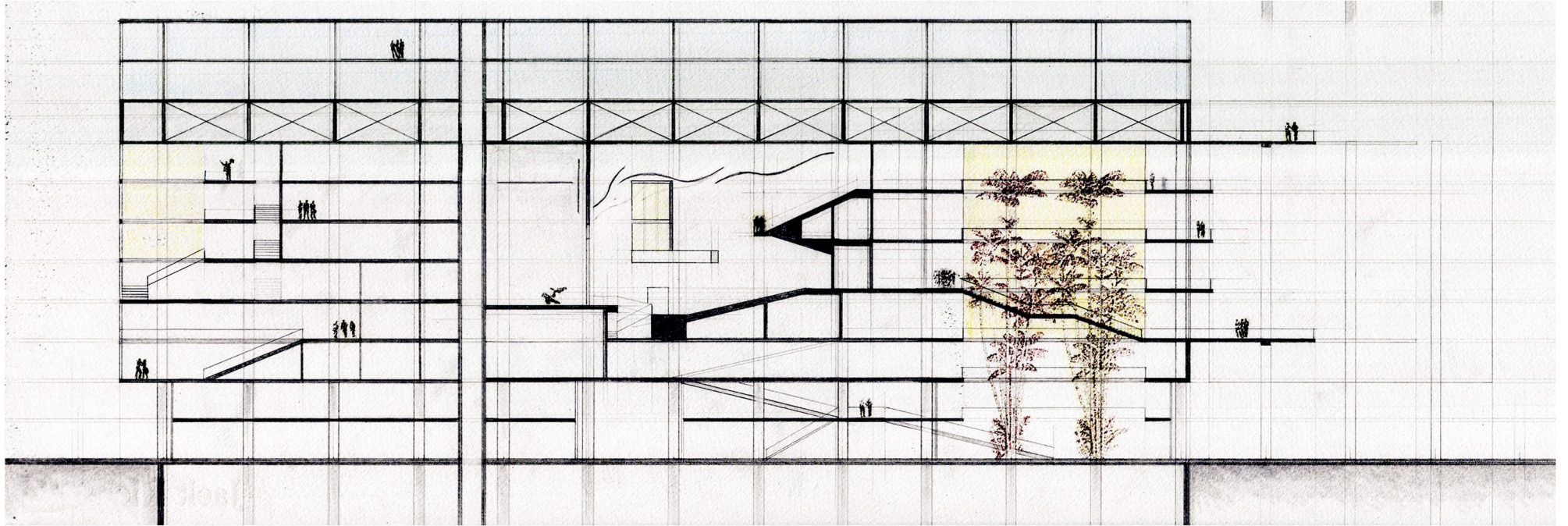




Final Sections:

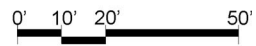
Figure 71: Transverse section through ramp looking North

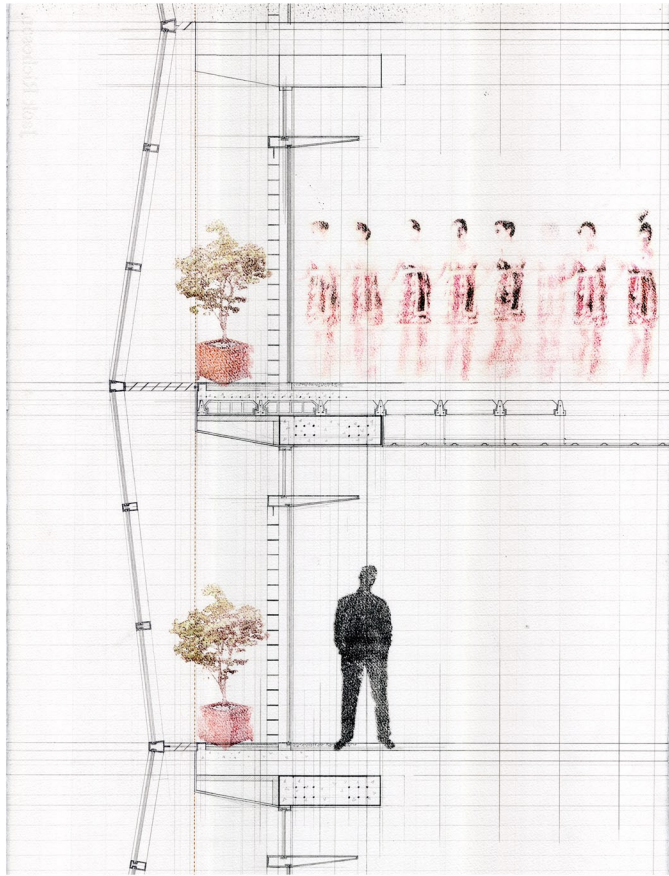




Final Sections:

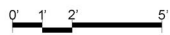
Figure 72: Transverse section through North Wing looking South





Final Section Details:

Figure 73: Section detail at Pennsylvania Avenue facade.





Final Section Details:

Figure 74: Section detail at ramp and adjoining facades



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Appendix A: Multimedia object citations:

Figure 13: NCPCC Framework Plan, L'Enfant Plan, Ellicott Plan:

National Capital Planning Commission and U.S. Commission of Fine Arts.
The Monumental Core Framework Plan: Connecting New Destinations with the National Mall. 2009

<http://www.ncpc.gov/UserFiles/File/Photo%20Library/L%27Enfant%20Plan,%201791.jpg>*

<http://www.dcvote.org/trellis/character/maps/47.jpg>*

Figure 16: Historic structures at thesis site including Alderney Dairy and French's Bookstore.

Goode, James M. *Capital Losses: A Cultural History of Washington's Destroyed Buildings*
(Washington DC: Smithsonian Institution Press, 1979) 267, 268

Reed, Robert. *Old Washington, D.C. in Early Photographs 1846-1932* (New York: Dover Publications, 1980) 59

Figure 19: Modern Brazilian design elements, US + Brazilian Embassy, and Neutra's book for Brazilian architects.

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Neutra, Richard. *Architecture of Social Concern in Regions of Mild Climate* (Sao Paulo: Gerth Todtmann, 1948)

Goodwin, Philip. *Brazil Builds: Architecture New and Old 1652-1942* (New York: Museum of Modern Art, 1943)

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(New York: Princeton Architectural Press, 1998)

Mindlin, Henrique. *Modern Architecture in Brazil*. (New York: Reinhold Publishing, 1956)

Figure 22: Ballroom Samba steps:

<http://www.thedancelesson.com/thedancelesson13.php>*

Figure 25: Collage of Movement and form:

http://4.bp.blogspot.com/_63ubahGk99A/Se7pfy80VZI/AAAAAAAAAog/cYYUXOzD4kU/s400/gene+kelly+by+gjon+mili3.jpg.* Gene Kelly in multiple-exposure dance sequence from movie "Cover Girl". 1944, Gjon Mili, LIFE Magazine.

http://www.tate.org.uk/modern/exhibitions/duchampmanraypicabia/images/duchamp_nude-descending-staircase.jpg*

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<http://pmsgagey.club.fr/Marey10.jpg> Etienne-Jules Marey*

<http://figure-drawings.com/how-to-draw-proportion-14.jpg>*

<http://figure-drawings.com/how-to-draw-proportion-18.jpg>*

<http://reginanuzzo.com/?p=36>*

*All web addresses last visited on 09/05/09